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IN THIS ISSUE

Emma Cole's *Grand Rapid's Flora*, published in 1901, has been an important source of information on the plants of western Michigan for over a century. In our first article, Garrett Crow brings the nomenclature of this work up to date, reveals the substantial physical documentation underlying the Flora, and provides much additional information that will be invaluable to botanists today in studying the Michigan flora. This is the first part of a multifaceted project by Dr. Crow and his collaborators to reexamine the flora of the Grand Rapids area to provide a modern assessment of that flora.

Richard Pearce and James Pringle then provide the details and results of their wide-ranging investigation into the origin of the common name of Joe-Pye-weed, which applies to a group of five species in the genus *Eutrochium* that occur in the eastern United States.

The remainder of this issue consists of several reports of range extensions and first state or region reports for representatives of the green algae, slime molds, and flowering plants. These are followed by two interesting book reviews. One deals with Native American ethnobotany and particularly with the teaching and experiences of an Ojibwe medicine woman, Keewaydinoquay Peschel. The other explores the important biological relationship between monarch butterflies and milkweeds.

—Michael Huft

REVIEWERS FOR 2017

I wish to thank the following people who reviewed manuscripts during 2017 for *The Great Lakes Botanist*. Their comments were important, both to the authors and to the editor, and their efforts, which are essential to maintaining the high quality of the journal, are greatly appreciated.

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EMMA COLE'S 1901 *GRAND RAPIDS FLORA*: NOMENCLATURALLY UPDATED AND REVISED

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ABSTRACT

In 1901 Emma J. Cole published *Grand Rapids Flora*, a work that remains the most recent comprehensive account of the plants specific to West Michigan and that is still consulted by those with interests in local native habitats, the historical status of rare and endangered plants once known from the area, and the flora of the region in general. However, to make Cole's *Flora*, an important historical document, more useful to the present day, an updated Checklist of the plants in her *Flora* is presented in an alphabetic format that brings her plant names up-to-date with current nomenclature. The updated Checklist catalogs a total of 1275 taxa at the species level, whereas Cole's (1901) *Flora* treated 1290 taxa (including varieties). Although Cole did not typically cite specimens in her *Flora*, it was documented by herbarium specimens that she collected and deposited in the Kent Scientific Institute (forerunner of the Grand Rapids Public Museum); a large number of Cole's specimens are extant and are housed in the University of Michigan Herbarium, with a large number of duplicates located at the Michigan State University Herbarium and elsewhere. Cole also consulted specimens collected by students and colleagues in private collections, many of which are also extant. These specimens are now cited in the updated Checklist documenting nearly all the species in her *Grand Rapids Flora*. Remarkably about 97% of the species in the updated Checklist are documented by at least one voucher specimen; Cole's *Flora* was remarkably well documented. Nomenclatural issues are also discussed. As a well-regarded teacher of botany at Central High School of Grand Rapids, Michigan, she had a great impact on her students, several of whom she mentions in her *Flora*; some biographical information of these students is included here.

KEYWORDS: Emma J. Cole, flora of Grand Rapids, Michigan flora, vascular plants, biodiversity, historical botany, herbarium voucher specimens.

INTRODUCTION

One hundred sixteen years ago *Grand Rapids Flora: A Catalogue of the Flowering Plants and Ferns Growing Without Cultivation in the Vicinity of Grand Rapids, Michigan*, by Emma J. Cole (1901) was published. Emma Jane Cole (1845–1910), a well-loved teacher at Central High School in Grand Rapids, was not only an instructor of botany, but served as the curator of the botanical collections of the Kent Scientific Institution, then housed with the other natural history collections of the Institution at Central High, and was elected vice president of the Institution in 1900 (Stiver 2007, unpublished manuscript). Early in her 26-year career as teacher she began to see a great need for an up-to-date account of the plants of Grand Rapids, the seat of Kent County, Michigan, and the sur-

TABLE 1. Examples of entries from Cole's Flora with corresponding entries from the updated Checklist.

Examples from Emma Cole's <i>Flora</i>	Corresponding Entry from Updated Checklist
ORCHIDACEAE	
CYPRIPEDIUM L. MOCCASIN-FLOWER	
403. C. acaule Ait. Stemless Lady's Slipper In sphagnous swamps or dry woods; scarce. May. Spruce Lake; Mill Creek woods; Bronner Lake; East St. Pinery; Hogadone Creek; Mud Lake, Plainfield; abundant in the Saddle-Bag Swamp region until 1895.	Cypripedium acaule Aiton; Pink Lady-slipper, Moccasin Flower, Stemless Lady-slipper; Jun 1893 (ALBC); <i>H. M. Bailey</i> s.n., 23 May 1891 (MICH); <i>Skeels & Shaddick</i> s.n., 27 May 1893 (MSC). In correspondence with Emma Cole during the process of proof-reading her manuscript, Luther Livingston reminisced: "In 1885 my brother Lincoln B. L.[ivingston] found a specimen in Saddle Bag Swamp with a double lip, the lower flat- tened the upper inflated and resting upon the lower. One lip was not within the other. The next day I went out there and gathered a basketful, certainly 200 or 300 of the blossoms. They were all in a little patch of tamaracks south of the R.R. track . . ." (unpublished notes written by Livingston to Emma Cole in June 1900, Gray Herbarium Archives).
CYPERACEAE	
HEMICARPHA Nees.	
318. H. subsquarrosa Nees. <i>H. micrantha</i> (Vahl.) Britton. Wet sandy lake margins; infrequent. July–Oct. Bostwick Lake; Silver Lake; Soft Water Lake. Plentiful at these stations.	Lipocarpha micrantha (Vahl) G. C. Tucker (<i>Hemicarpha subsquarrosa</i> of Cole; <i>H. micrantha</i> of Voss); Dwarf-bulrush; 17 Sep 1898 (ALBC); 16 Sep 1898, 28 Sep 1898, 16 Oct 1898 (MICH). SPECIAL CONCERN.
MAGNOLIACEAE	
LIRIODENDRON L. TULIP-TREE	
556. L. Tulipifera L. Moist woods; scarce. First of June. Mill Creek woods; Reed's Lake; Berger Creek; East St. Pinery; West Bridge St. Formerly frequent but clearing and draining have made the soil drier, so that there are few young trees at present.	Liriodendron tulipifera L.; Tulip Tree; <i>Skeels</i> s.n., 12 Oct 1895 (ALBC, MSC). Cole mentions that this species is one of the southern plants that reaches its northern limit along the Grand River Valley. She also specifi- cally mentions it occurring in the Mill Creek woods, which Skeels and Shaddick thoroughly studied. During our inventory of that locality in 2016 for our project we rediscovered Tulip Trees so large that we believe they were growing at the site when Skeels and Shaddick botanized there: <i>Alan</i> <i>Stockdale</i> , <i>Lydia Abma</i> , & <i>Garrett Crow 1078</i> (CALVIN, MICH, MSC).

rounding area to aid in the teaching of botany to her many students at the high school.

Emma Cole had access to Nathan Coleman's (1874) *Catalogue of Flowering Plants of the Southern Peninsula of Michigan*—especially significant because it was commissioned and published by the then newly established Kent Scientific Institute in Grand Rapids (as “Miscellaneous Publications, No. 2”). This work was an updating of Winchell's (1861) catalogue but based on less than two years of fieldwork, mostly conducted in Kent County; the whereabouts of his specimens, if they still exist, is unknown (Lammers 2016). Perusal of his *Catalogue* reveals the work to have been a less than adequate regional account of the flora. And while Cole had the more comprehensive *Michigan Flora* by Beal and Wheeler (1893) as an invaluable reference to consult, it was state-wide in scope and did not serve her well in her teaching. She had so much more in mind; not only was it her goal to create a detailed floristic account of a rather large, geographical area centered on the City of Grand Rapids, but in addition to the scientific names, she also included botanical synonyms and common names and provided information on the general period of blooming, habitat information, specific localities for plants somewhat restricted in occurrence, notes on rarity or vulnerability, and noted the advent of aliens (some of which were first reports for the State). She also included background information regarding the influence of climate on the local flora and the distribution of species (e.g., northern or southern species reaching their geographical limits in the Grand Rapids area), and the impact of glacial events in shaping local geomorphology and soils. Furthermore, she gave descriptions of the more ecologically interesting sites within her study “district,” along with lists of species to be found at each such locality. For examples of entries from Cole's *Flora*, see Table 1.

Enormous changes have taken place within and around Grand Rapids since the horse and buggy days of Emma Cole's study. Yet, her account published in 1901 for the greater Grand Rapids area remains the most recent comprehensive account of the plants specific to the area. The area covered is 585 square miles consisting of 16 townships of Kent and Ottawa counties centered on the City (Figure 1); also included is $\frac{1}{4}$ of Vergennes Township (9 sections), an eastern extension to incorporate the area around her family's country home, where she did extensive collecting. Her collections from “Vergennes” are primarily from 1878 onward, the collecting perhaps stimulated by the botanical training received at Cornell University in 1876–77 and 1878–79 (Stivers 2007).

This work is *still* consulted by those of us with keen interests in ecologically interesting habitats, in the status of rare and endangered plants once known from the area, and in the flora of the region in general. In 2014 David Warners of Calvin College, Bradford Slaughter, then of the Michigan Natural Features Inventory (now of Orbis Environmental Consulting), and I, having used and greatly appreciated Cole's *Flora*, initiated a project centered at the Calvin College Herbarium to reexamine the flora of the Grand Rapids area with the intent of 1) identifying and accessing specific areas studied by Cole, 2) determining the impact of development on the flora as a whole, 3) reassessing specific localities emphasized by Cole as of significant botanical interest using Floristic Quality Assessments (Reznicek et al. 2014), 4) discovering and inventorying additional

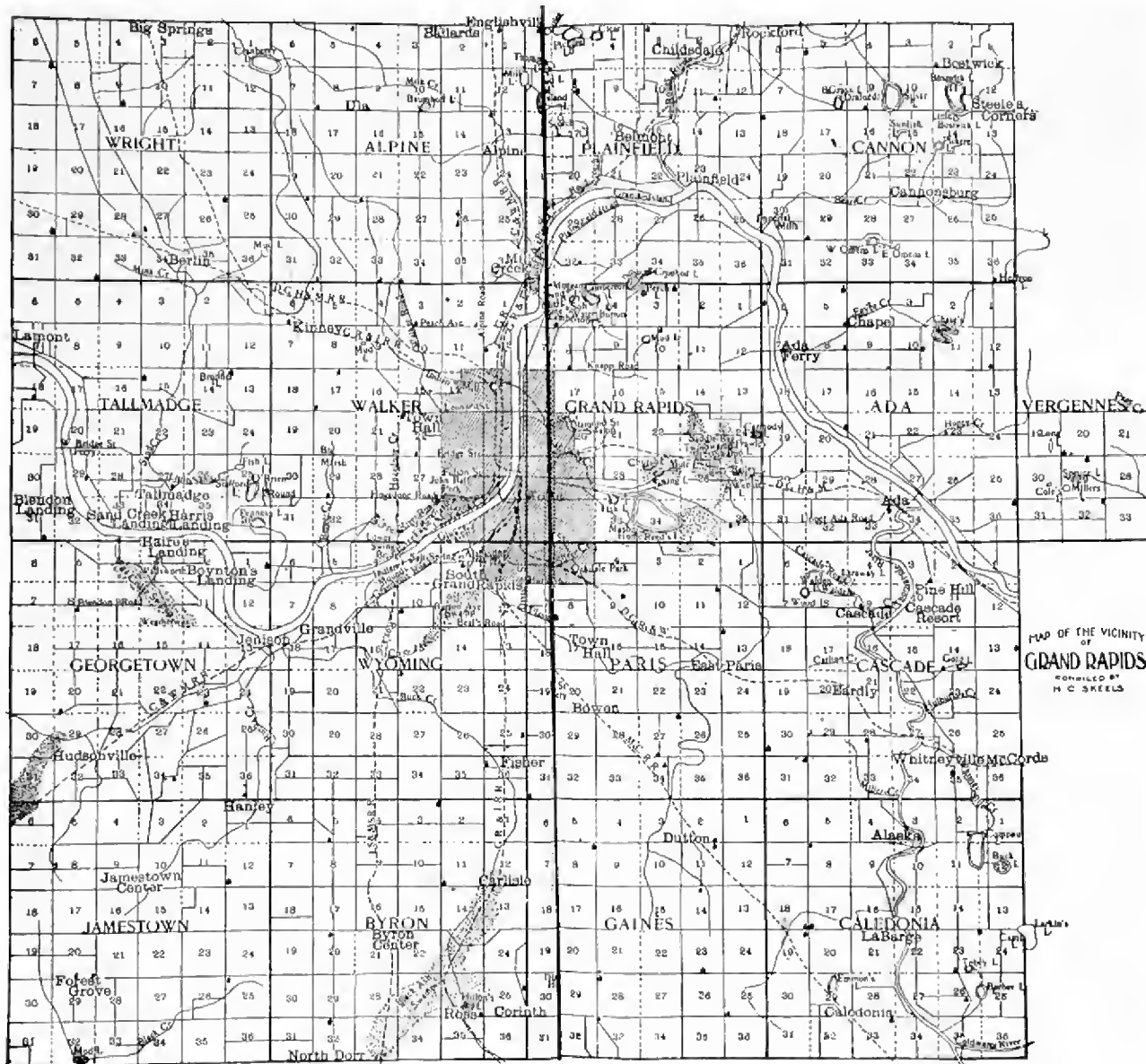


FIGURE 1. The geographical area covered by Cole's *Grand Rapids Flora* prepared by Homer C. Skeels and included in Cole's *Flora*. The four westernmost townships occur in Ottawa County, all others belong to Kent County; 9 Sections of Vergennes Township surround Cole's family home.

ecologically interesting sites within Cole's "district," and 5) determining the current status of the 58 plants listed by Cole and now regarded by the State of Michigan as Endangered (8 taxa), Threatened (31 taxa), or of Special Concern (19 taxa). Furthermore, our ultimate goal is to prepare an up-to-date flora of the Grand Rapids area for use by botanists, students, and others concerned with local conservation and preservation of our native flora and remnant natural areas that are still home to presettlement manifestations of some of Michigan's ecologically special habitats.

MATERIALS AND METHODS

To make Emma Cole's *Flora*, an important historical document, more useful to the present day, I have prepared an updated Checklist (Appendix 1) of the species in her *Flora*, bringing her taxonomic names up-to-date with currently accepted nomenclature. I have also attempted to discover and cite all the extant herbarium specimens that she collected; additionally I have cited specimens of other collectors mentioned in her Introduction, specimens that she stated were consulted in the preparation of

her monumental work. Where subsequent annotations of those extant specimens indicate species that were not cataloged in her *Flora*, I have added those names to the updated Checklist. Hence, this is an update of Cole's *Flora*, representing the plants of the Grand Rapids area at the beginning of the 1900s; preparation of a modern flora is yet to come.

Cole's (1901) *Flora* treated 1290 taxa (including varietal trinomials as distinct entries), cataloging 1111 natives, 176 non-natives, and 3 species that were anticipated, but not yet discovered, within her *Flora* area. Approximately 97% of the taxa in Cole's *Flora* are documented by at least one voucher specimen; only 43 taxa were undocumented (just 17 of which were native). This is a remarkably well-documented *Flora*.

About 5000 extant specimens in total document Cole's *Flora*, including approximately 2100 voucher specimens collected by Emma J. Cole from the greater Grand Rapids area, most intensively collected during the period 1892–1900, and additional specimens collected by her colleagues and former students. The bulk of Emma Cole's specimens are housed at the University of Michigan Herbarium (MICH) as a permanent loan of specimens belonging to the Grand Rapids Public Museum; Cole's specimens made up the core of the herbarium of the Kent Scientific Institute which was then housed at Central High and which was utilized by the Grand Rapids Botany Club as well as by Cole in her teaching (Stivers 2007, unpublished manuscript)

The updated Checklist is arranged by the current name rather than the name used by Cole. One could have employed Cole's sequence, giving the updated taxonomic nomenclature after hers, but that would have been counterproductive to the way we tend to use Cole's *Flora*. Typically we are thinking in current nomenclature, wondering "What did Cole have to say about this taxon in 1901?" Hence, it is easier to look up the name in the updated Checklist, and then utilize her index to access the historical information in Cole's *Flora*. Likewise, if one wishes to access specimen data using the "Search Specimen" button at MICHIGAN FLORA ONLINE (2011), one would use the currently accepted name attached to the specimen, as annotated. For example, if one reading Cole's *Flora* wished to know where Cole collected *Eriophorum polystachyon*, the "Search Specimen" feature would not find any entries, but knowing that Cole's taxon is now *Eriophorum viridi-carinatum*, one would find four specimens collected by Cole in the database. Additionally, as we are inventorying sites for our project that were also collected in by Cole or her students, we are comparing our modern checklist of those sites with historical specimens collected at those sites to produce Floristic Quality Assessments (Reznicek et al. 2014), thus it is more expedient to have the updated Checklist in the format presented here.

DISCUSSION

Over the 116 years since the publication of Cole's *Flora*, there have been numerous changes in nomenclature, most arising from careful monographic and floristic studies involving examination of the taxonomic status of various groups, as well as changes in taxonomic concepts resulting in merging or splitting of genera or of species, or the elevation of certain infraspecific taxa to the rank of species, while others treated as varieties by Cole may now be regarded as unworthy of any taxonomic recognition. Thus, a fair number of names used in Cole's *Flora* differ from those in current use.

Nomenclatural Issues

Cole (1901) stated that she carefully followed the nomenclature of *Index Kewensis*, then highly regarded as the "up-to-date" nomenclature. This is a compilation of all published plant names using the date of publication of *Species Plantarum* by Linnaeus in 1753 as a starting point. It was initially published as a compilation by B. Daydon Jackson in two volumes (Jackson, 1893), and was

maintained thereafter at the Royal Botanic Gardens, Kew, with hard-copy supplements published at five-year intervals. It is now incorporated into the online *International Plant Names Index* (IPNI 2015). Prior to 1913, *Index Kewensis* indicated which names were to be accepted and which were synonyms. Thus, Cole, publishing in 1901, could rely on these taxonomic judgments in making her nomenclatural decisions. These were also the names largely used in the sixth edition of Gray's Manual (Gray et al. 1890), the primary reference Cole relied on for making identifications. Emma Cole also corresponded with Dr. B. L. Robinson, Director of the Gray Herbarium, Harvard University, and his young assistant, M. L. Fernald, seeking their advice, as well as clarification of nomenclatural questions, during the preparation of her manuscript; she sent Robinson and Fernald proof sheets as they were typeset.

At that time, Robinson and Fernald were in the process of preparing the seventh edition of Gray's Manual (Robinson and Fernald 1908). As a sample of Cole's queries, we see in a handwritten letter to B. L. Robinson in 1900: "Shall I use *Brunella* or *Prunella*? Shall I use *Physocarpus opulifolius* maxim? or *Neillia opulifolia* Benth. & Hook.?" (Emma J. Cole, May 12, 1900, unpublished letter in Gray Herbarium Archives). Ultimately, Fernald examined proof-sheets for the entire manuscript, including the index, as indicated in a later letter (Emma J. Cole, Nov. 24, 1900, unpublished letter in Gray Herbarium Archives): "If you will allow me to further intrude upon your time and patience I should like you to see my preface and index. You always see some error which I do not."

For numerous entries in her *Flora*, Cole often also provides, as synonyms, botanical names that were used in Britton and Brown's (1896–1898) *Illustrated Flora of the Northern United States*. In fact, frequently the name on the herbarium specimen label is the name from Britton and Brown, differing from the name eventually published in her *Flora*. At that time botanists followed the rules of nomenclature laid down in the *Paris Code* (de Candolle 1868), but this was also a period when rules regarding the application of names were somewhat in flux. European and some American botanists practiced a major nomenclatural divergence known as the "Kew Rule," an unwritten rule whereby a species that is transferred to a different genus could be given a new specific epithet, even though the original epithet could have been transferred to the new genus, contrary to the present-day rule requiring the use of the same specific epithet in the new genus, unless the epithet is already used for another species in the new genus, as provided by the current *International Code of Botanical Nomenclature* (McNeill et al. 2012).

Many American botanists were unhappy with this practice, which ignored strict priority of publication, and developed the *Rochester Code* of botanical nomenclature [of 1892], championed by Nathaniel Lord Britton of the New York Botanical Garden. The *Rochester Code* followed a rule of "strict priority," which requires the use of the earliest published epithet, even if, upon transfer of the epithet of the species to a different genus, the new binomial resulted in a tautonym, that is, a name in which the genus name and the specific epithet are the same (Lawrence 1951). For example, when yellow rocket, which was originally named *Erysimum barbarea* by Linnaeus, was transferred by Robert Brown to the new genus *Barbarea*, Brown applied the Kew Rule and created a new specific epithet, resulting in the new combination *Barbarea vulgaris* (L.) R. Br. In contrast,

in MacMillan's (1892) published account of a local flora in a report of a natural history survey in Minnesota, he followed the "strict priority of publication" rule of the *Rochester Code* in transferring Linnaeus' epithet, thereby creating the new combination *Barbarea barbarea* (L.) MacM., a tautonym. This practice was later specifically disallowed, as it is in the current Code; see the discussion of progressive changes in the rules of nomenclature in Lawrence (1951). Emma Cole, following the nomenclature of *Index Kewensis* (and of Gray et al. 1890) used the name *Barbarea vulgaris* in her *Flora*, but also provided as a synonym the name from Britton and Brown (1896-98), *Barbarea barbarea*—now regarded as an invalid name. It was not until 1935 that a truly international Code was adhered to by all botanists worldwide (Lawrence 1951); this is another reason that many of the names of Cole's *Flora* differ from those in use today.

Herbarium Specimens That Document the Flora

Emma Cole had access to numerous specimens in private herbaria that she consulted in preparation of the *Flora*, mostly those of colleagues and former students; these are also cited in this updated Checklist (Appendix 1). MICHIGAN FLORA ONLINE (2011) has recently added a "Search Specimen" button on their website, allowing one to search for specimens of Emma Cole's colleagues mentioned in the Introduction of her *Flora*. For example, Hattie M. Bailey (also known as "Mrs. Hattie Pieters"), listed as a biology and zoology teacher at Central High in 1894–1896 (Anonymous 1895, 1896), collected a large body of specimens that are incorporated into the collection at MICH, mostly from the early 1890s (444 sheets that are indicated as Hattie M. Bailey or "Ex Herb. Hattie M. Bailey"). Similarly, George Sones' specimens, numbering 238 sheets, are mostly from the late 1880s to the early 1890s and are primarily at MICH (a few are at MO or MSC). Cole also cites a few critical specimens of Herman Hyser from the Plainfield Village area; these are now at MICH.

Cole gratefully acknowledges C. F. Wheeler, Michigan Agriculture College, to whom she sent "doubtful" specimens as well as her entire collection of *Carex* and *Potamogeton* for confirmation or identification; Wheeler's collections of *Carex* at MSC and MICH that were made in the Grand Rapids area in 1895–97 confirm his interest in her project and are likewise cited here. In a letter to B. L. Robinson (Emma J. Cole, Oct. 30, 1898, unpublished letter in Gray Herbarium Archives), Cole tells him that: "Prof. C. F. Wheeler has from time to time gone through the herbariums of the City [of Grand Rapids] and has identified the sedges and all other doubtful plants and the "List" when published ought to represent this district thoroughly and accurately."

Specimens at the Albion College Herbarium (ALBC) came to the college as a gift from C. W. Fallass (J. D. Skean, pers. comm. 2016), including various specimens collected by Emma Cole, Mrs. Mary B. Fallass, Florence Fallass, and Charles W. Fallass. Cole specimens at the Gray Herbarium, Harvard University (GH) are duplicates sent to B. L. Robinson and M. L. Fernald for determination; Cole (1901) cites Fernald as having provided the identifications for *Antennaria* (Pussytoes), a difficult genus. Specimens at Cornell University, her *alma mater*, perhaps were given as a consequence of her connection with Liberty Hyde Bai-

ley, who was at Michigan Agricultural College until he went to Cornell in 1888. Cole would have relied on Bailey's keys to *Carex* written for Gray's *Manual* (Gray et al. 1890) in addition to the assistance she received from C. F. Wheeler.

Unusual adventives.

While adventives were a relatively low number, 176 (12.4% of total flora), there were a number of species that were first documented by Cole for Michigan. And a number of them were particularly noteworthy. Cole (1901) noted that as early as 1892 *Verbesina encelioides* (Golden Crownbeard), a species of western North America, appeared on a farm in Paris Twp. (Sec. 19) owned by J. E. Phillips. In 1893 another western plant, *Helianthus petiolaris* (Prairie Sunflower), appeared on the Phillips farm. She learned that these introductions were linked to the use of refuse as fertilizer obtained from the Felt-boot Factory located in the City on Mill Street, where wool was obtained from New Mexico and other parts of the Southwest. Both of these plants are annuals and were found to be persisting from year to year on the farm. She took a great interest in these unquestionably introduced plants associated with wool refuse, the seeds clinging to wool and withstanding the processing in the factory, yet still able to grow. Her *Flora* mentions a number of additional western species appearing as adventives on the Phillips farm (Table 2). Furthermore, a number of Old World adventives also began to appear on the Phillips farm (Table 2). Cole learned that the factory had recently begun importing other materials from the Old World, particularly India, Persia and Russia. As she was busy drafting her *Flora* during the summer of 1900, she sent a specimen of Brassicaceae to M. L. Fernald, who identified it as *Sisymbrium irio* (now *S. loeselii*), a plant of Eurasian affinity (Emma J. Cole, June 30, 1900, unpublished letter in Gray Herbarium Archives). Interestingly, the 7th Edition of Gray's *Manual* (Robinson and Fernald 1908) included "Grand

TABLE 2. Unusual adventives growing on the J. E. Phillips farm introduced in refuse used as fertilizer from the Felt-boot factory, Mill Street, City of Grand Rapids.

Taxon	Native Geographical Affinity
Asteraceae:	
<i>Artemisia carruthii</i> – Kansas Mugwort	Western N. Am.
<i>Centaurea virgata</i> – Turkish Knapweed	Old World, Turkey
<i>Dyssodia papposa</i> – Stinking-marigold	Western N. Am.
<i>Erigeron flagellaris</i> – Fleabane	Western N. Am.
<i>Grindelia squarrosa</i> – Gumweed	Western N. Am.
<i>Helianthus petiolaris</i> – Plains or Plains Sunflower	Western N. Am.
<i>Schkuhria multiflora</i> – Manyflower False Threadleaf	Western N. Am.
<i>Thelesperma megapotamicum</i> – Thelesperma	Western N. Am.
<i>Verbesina encelioides</i> – Golden Crownbeard	Western N. Am.
Brassicaceae:	
<i>Erysimum capitatum</i> Western Wall-Flower	Western N. Am.
<i>Sisymbrium loeselii</i> – Small Tumbleweed Mustard	Old World, Eurasia
Fabaceae:	
<i>Medicago minima</i> – Little Bur-clover.	Old World, Eurasia

Rapids, Mich. Miss Cole” under *Sisymbrium irio*. The advent of a total of 12 species were ultimately linked to this Felt-boot factory and use of its refuse as fertilizer.

Cole's Students

Emma Cole had an enormous impact on her students, encouraging them to be active in the Grand Rapids Botanical Club and accompanying these young people on various botanical outings. Numerous collections (ca. 470) were made by Homer C. Skeels and Miss Jennie Shaddick (the labels are in Skeels' handwriting), and many others collected only by Skeels, or by Shaddick and friends (the labels are then in Shaddick's handwriting). These were cited in Cole's *Flora* as “O. H.” (i.e., Our Herbarium, which is printed at the top of their standard label) and are mostly at MSC (Skeels was then a student at Michigan Agricultural College), but a number of their specimens are also at MICH. It was Skeels who prepared the detailed map of the Grand Rapids “District” that appears as an insert at the front of Cole's *Flora* (Figure 1).

It is noteworthy that Homer C. Skeels, Class of 1893 (Anonymous 1897), went on to have a career in botany, having received a B.S. from Michigan Agricultural College in 1898 (Anonymous 1934a) and in 1897 obtained a position with the USDA in the Office of Foreign Seed and Plant Introduction in Washington, DC. In that position Skeels became recognized nationally as an expert at seed identification and compiled a collection of ca. 45,000 samples of seeds of agricultural importance for the USDA (Skeels and Van Eseltine 1923; Anonymous 1934a, 1934b). Incidentally, he married Jennie Shaddick, Class of 1893 (Anonymous 1897), his collecting partner for so many localities cited in Cole's *Flora* as “O.H.” (Our Herbarium).

W. Earle Mulliken's specimens number 548 sheets (mostly at MICH, also at ALBC and MSC), occasionally collected with Emma Cole; a number were collected with his good friend and Emma's young relative, Leon J. Cole (a student at Michigan Agricultural College). Mulliken resided in Grand Rapids following high school graduation. His passion was especially for birds, and he served as co-Managing Editor of volumes 1–3 of the *Bulletin of the Michigan Ornithological Club* (Watkins 1897, 1898; Cole, L. J. 1899). He continued his pursuit of ornithology in California and in 1904 was listed as Junior vice president of the Cooper Ornithological Society on the cover of the society's journal, *The Condor*. At that time he was a student at the University of California-Berkeley where he was partially financed by a loan from Cole (Stivers unpublished manuscript). Emma Cole visited her former student during a 1905 trip to California in which she traveled extensively throughout the state to collect plants (Stivers unpublished manuscript).

Three other former students, Ralph E. Matteson, Grace Fyfe, and F. P. Daniels, were also active in the Grand Rapids Botanical Club, and their collections, usually as accompanying collectors with Skeels, Shaddick, or Emma Cole, are mostly at MSC and MICH.

Burton E. Livingston, Class of 1893 (Anonymous 1897), was another of Cole's students who had a career in botany. Initially he conducted county vege-

tation surveys after high school in Kent, Roscommon, and Crawford Counties for the Michigan Geological Survey, and his first publication appeared in the Report of the State Board of Geological Survey of 1901—the year of Cole's *Flora* (Livingston 1902, 1905). He completed a B.A. at the University of Michigan in 1898 and received a Ph. D. in Botany from the University of Chicago in 1901, where he continued as a research assistant until 1905. He spent 1906–1909 as a researcher at the Desert Laboratory of the Carnegie Institution of Washington at Tucson, Arizona, after which he accepted a faculty position in plant physiology at John Hopkins University. He became well known for his research, involving both field and laboratory settings, on the physiological ecology of desert plants and coauthored the classic reference *The Distribution of Vegetation in the United States* (Livingston and Shreve 1921) (Smith 2005).

Leon J. Cole's strong interest in agriculture brought him from his home in Allegany, New York, to Michigan Agricultural College, where he spent 1894–1895 and 1897–1898 as a student. He became good friends with W. Earle Mulliken when he came to visit his relative, Emma J. Cole. While their activities on these visits were primarily botanical, both young men shared a passion for ornithology. L. J. Cole served as co-Managing Editor of the Bulletin of the Michigan Ornithology Club (with W. E. Mulliken) for volumes 1–2 (Watkins 1897, 1898), and became Editor-in-Chief of the journal the following year (Cole, L. J. 1899). Leon transferred to the University of Michigan where he received an appointment as assistant in Zoology 1898–1902, graduating with an A.B. in 1901. During that time he had the distinction of participating in the famous railroad magnate's Harriman Alaska Expedition of 1899. He entered graduate studies at Harvard University, receiving a Ph.D. in genetics in 1906, and began a career on the faculty of the University of Wisconsin in 1910, where he established and chaired a Department of Experimental Breeding, forerunner of today's Department of Genetics (McCabe 1979; Dickerson and Chapman 1989).

Luther S. Livingston, older brother to Burton by 11 years, graduated from high school in 1881 (Anonymous 1896) as Emma Cole was beginning her teaching career at Grand Rapids Central. It is not clear if he was ever one of her students. In any case, they became life-long friends, and Cole, taking him up on an offer to proofread her *Flora* manuscript, sent him typeset proofsheets as they were completed (as evidenced by a series of unpublished letters from Emma Cole to Luther Livingston 1899–1901, Gray Herbarium Archives). In the only extant letter in the Gray Herbarium Archives from Luther Livingston to Emma Cole, he provided her with his own recollections of forays for plants with his brother, Lincoln, during his youth in Grand Rapids, some of which she incorporated into her manuscript. With both a love of nature and a passion for books and cataloging, he began a career in New York City, initially as the shipping clerk for the bookdealers Dodd, Mead and Co. Because of his love of plants, his capacity for scientific names, and his aptitude for providing clear descriptions, he was offered a job preparing catalogues for a greenhouse company in Short Hills, New Jersey. In 1891 the company sent him to Colombia to collect orchids where he, in his 18 months of field work in the tropical forests of the upper stretches of the Magdalena River, amassed 1,000 cases of plants of the florist's orchid, *Cattleya trianae*, and an equal number of cases of other rare and beautiful orchids. These

cases were brought down the Orinoco River by dugout canoe and shipped back to the United States. The financial Panic of 1893 had a substantial adverse impact on the orchid trade, and Luther went back to his old career in the bookdealing business where he ultimately became a partner in a new company, Dodd and Livingston, which he established with one of the members of Dodd, Mead and Co. Luther eventually became the best-known bookdealer on either side of the Atlantic as a result of his travels to England. An accident while gardening led to a far-too-shortened life ending at age 50, just as he was about to become the first librarian of the Harry Elkins Widener collection at Harvard University. The information in this paragraph is principally derived from Winship (1914).

CONCLUSION

As Emma Cole had just completed her *Grand Rapids Flora*, she conveyed in a letter to Luther S. Livingston (her invaluable proofreader), that she had embarked on this floristic project for the sake of her students—that the study of systematic botany “is in my judgement [sic], the right way to interest young people in the study of nature, the influences of the woods, the flowers and the fields will be life lasting” (Emma J. Cole letter, Apr. 10th, 190[1], Gray Herbarium Archives). It is clear that Emma Jane Cole was not only a beloved teacher, a well-respected scientist, and a lover of the natural world around her, but that she was above all an incredible mentor to those whose lives she touched.

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APPENDIX 1. UPDATED CHECKLIST OF COLE'S 1901 *GRAND RAPIDS FLORA*.

This updated Checklist catalogs a total of 1275 taxa at the species level, whereas Cole's (1901) *Flora* treated 1290 taxa (including varieties). Since Cole's specimens have no collection numbers, her specimens are indicated here by date collected and herbarium acronym(s) only, omitting the usual "*Cole* s.n." Since all of these specimens were examined by E. G. Voss during the preparation of his *Michigan Flora* (Voss 1972, 1985, 1996) and critical specimens were recon-

firmed for *Field Manual of Michigan Flora* (Voss and Reznicek 2012), the names on these specimens were accepted without my examining them. The University of Michigan Herbarium provided access to label data of all Cole's specimens from the electronic database at MICH, each of which has been annotated by E. G. Voss, A. A. Reznicek or various specialists; the database at MICH includes Cole specimens examined by E. G. Voss at other herbaria. I also searched the herbarium at Michigan State University (MSC) for additional specimens collected by Cole. Furthermore, I searched the electronic databased of MICH and both the online database and herbarium of MSC for collections by others that are specifically mentioned in her *Flora*. Those specimens at MSC were examined and annotated by me.

The nomenclature of Gymnosperms and Angiosperms adopted for this updated Checklist follows that of *Field Manual of Michigan Flora* (Voss and Reznicek 2012), with a few exceptions where nomenclatural changes (as of 2017) have been updated in MICHIGAN FLORA ONLINE (2011). The species names and family assignments of Pteridophytes follow MICHIGAN FLORA ONLINE (2011), since this group is not included in Voss and Reznicek (2012). The status of rare plants indicated in the updated Checklist is based on the listing of Michigan's special plants by Michigan Natural Features Inventory (2016). Localities of these plants on specimen labels are sufficiently vague, or sites now destroyed (e.g., Diamond St. Swamp), thus rare plant information is not compromised in the Checklist. For each entry, the name currently in use is given first. For clarity, the scientific name given by Cole (1901) in her *Grand Rapids Flora*, if differing from the name currently in use, is noted in parentheses after the taxon name as "of Cole"; these parenthetical names may or may not be synonyms. Likewise, if names in the updated Checklist differ from those in Voss (1972, 1985, 1996), the names used by Voss are included after Cole's names and indicated as "of Voss" and are synonyms. If the name written on an E. J. Cole specimen label differs from the name in her *Flora*, that name on the label is given in parentheses after the citation of that specimen (after finalizing names for her *Flora*, Cole did not go back and annotate the names on her specimens). Cole's *Flora* frequently includes trinomials (indicating varieties), but taxa in this updated Checklist are treated only at the species level; it is not unusual for a taxon treated by Cole as a variety to be treated now as a distinct species.

The sequence of taxa in the updated Checklist is by major groups (Pteridophytes, Gymnosperms, Angiosperms: Monocots, and Primitive Angiosperms and Eudicots). Within each major group, the families are alphabetically arranged, as are the genera and species within each family.

PTERIDOPHYTES

ATHYRIACEAE (Lady Fern Family)

Athyrium filix-femina (L.) Roth.; Spleenwort; 1 Sep 1892, 15 Aug 1895 (MICH); *H. M. Bailey* s.n., 15 Jul 1894 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC).

Deparia acrostichoides (Michx.) Desv. (*Asplenium thelypteroides* of Cole); Silvery Spleenwort; 30 Aug 1898 (MICH); *H. M. Bailey* s.n., 2 Aug 1892 (MICH).

BLECHNACEAE (Chain Fern Family)

Woodwardia virginica (L.) Smith; Virginia Chain-fern; 25 Jul 1898, 29 Jun 1899 (MICH);
Sones s.n., 26 Aug 1891 (MICH).

CYSTOPTERIDACEAE (Fragile Fern Family)

Cystopteris bulbifera (L.) Bernh.; Bulblet Fern; 3 Jun 1892 (MICH).

Cystopteris tenuis (Michx.) Desv. (*Cystopteris fragilis* of Cole); Fragile Fern; 2 Jun 1892,
Lowell (MICH); Mulliken s.n., 19 Aug 1897 (MICH).

DENNSTAEDTIACEAE (Bracken Fern Family)

Pteridium aquilinum (L.) Kuhn; Bracken, Bracken Fern, Brake; 15 Sep 1898 (MICH); *H. M.*
Bailey s.n., 29 Jul 1891 (MICH); Mulliken & *L. J. Cole* s.n., 10 Aug 1895 (MICH).

DIPLAZIOPSISACEAE (Spleenwort Family)

Homalosorus pycnocarpus (Spreng.) Pic. Serm. (*Asplenium angustifolium* of Cole); Narrow-
leaved Spleenwort; Skeels s.n., 7 Aug 1896 (MSC).

DRYOPTERIDACEAE (Wood Fern Family)

Dryopteris carthusiana (Vill.) H. P. Fuchs (*Aspidium spinulosum* of Cole); Spinulose Wood-
fern; 1 Sep 1878, 10 Sep 1898 (MICH); Mulliken s.n., 19 Aug 1897 (MICH).

Dryopteris clintoniana (D. C. Eaton) Dowell (*Aspidium Boottii* of Cole); Clinton's Shield
Fern; Skeels & Shaddick s.n., 23 Aug 1896 (MSC). Cole cited only a single record, that of
Homer Skeels and Jennie Shaddick (as O. H., meaning "Our Herbarium") collected at Mill
Creek woods, identified as *Aspidium Boottii*, but annotated by W. H. Wagner in 1969 as
Dryopteris clintoniana).

Dryopteris cristata (L.) A. Gray (*Aspidium cristatum* of Cole); Crested Shield Fern; 31 Jul
1893 (MICH).

Dryopteris goldiana (Hook.) A. Gray (*Aspidium goldianum* of Cole); Goldie's Woodfern; 20
Oct 1892, 14 Jul 1896 (MICH).

Dryopteris intermedia (Willd.) A. Gray (*Aspidium spinulosum intermedium* of Cole); Ever-
green Woodfern; *H. M. Bailey* s.n., Apr 1892 (MICH); Mulliken s.n., 19 Aug 1897
(MICH); Shaddick, Fyfe, Mulliken, *E. J. Cole* & *Wheeler* s.n., 6 June 1897 (MSC).

Dryopteris marginalis (L.) A. Gray (*Aspidium marginale* of Cole); Marginal Woodfern; 20
Oct 1892, 7 Aug 1896 (MICH); *H. M. Bailey* s.n., Apr 1892 (MICH).

Polystichum acrostichoides (Michx.) Schott (*Aspidium acrostichoides* of Cole); Christmas
Fern; *H. M. Bailey* s.n., 15; Jul 1894 (MICH); Mulliken s.n., 15 Jun 1896 (MICH); Skeels
& Shaddick s.n., 23 Aug 1896 (MSC).

EQUISETACEAE (Horsetail Family)

Equisetum arvense L. Field Horsetail, Scouring-rush; 6 Apr 1893 (MICH); *H. M. Bailey* s.n.,
2 May 1891 (MICH); Mulliken s.n., 19 Jul 1897 (MICH); Skeels & Shaddick s.n., 27 Aug
1897 (MSC).

Equisetum ×ferrissii Clute (*Equisetum laevigatum* of Cole); Skeels s.n., 13 July 1895 (MSC);
Skeels & Shaddick s.n., 25 Aug 1895, 25 Aug 1895 (MSC). The taxon is a commonly oc-
curring hybrid between *E. hyemale* and *E. laevigatum* (Voss and Reznicek 2012).

Equisetum fluviatile L. (*Equisetum limosum* of Cole); Water Horsetail; 19 Jun 1896, 23 Jun
1897 (MICH).

Equisetum hyemale L. (including *Equisetum robustum* of Cole); Scouring-rush; 12 Aug
1896, 6 Oct 1893, 7 Oct 1899 (MICH).

Equisetum palustre L.; Marsh Horsetail. This is chiefly a northern species, and although
Cole cites a single locality at a cold spring at Cedar Swamp, no specimens are known for
Kent or Ottawa Counties (Voss and Reznicek, 2012).

Equisetum pratense Ehrh.; Meadow Horsetail; probably misidentified; a northern species
and no Cole specimen is extant; no record for Kent Co. in Voss and Reznicek (2012). A sin-
gle specimen collected by Skeels and Shaddick from Mill Creek bears that name on the
label, but has been annotated as *E. arvense*, a species we have encountered at Mill Creek
in 2015-16.

Equisetum scirpoides Michx.; Dwarf Scouring-rush; Skeels & Shaddick s.n., 23 Aug 1896
(MICH, MSC).

Equisetum sylvaticum L.; Woodland Horsetail; 20 May 1898 (MICH); *Skeels & Shaddick* s.n., 27 Aug 1897 (MSC).

Equisetum variegatum Schleich.; Variegated Scouring-rush. No documentation for Kent or Ottawa Counties exists (Voss and Reznicek (2012)).

LYCOPODIACEAE (Clubmoss Family)

Dendrolycopodium obscurum (L.) A. Haines (*Lycopodium obscurum* of Cole); Ground-pine; 12 Oct 1892, Sep 1893 (MICH); 1 Oct 1894 (MSC).

Diphasiastrum digitatum (A. Braun) Holub (*Lycopodium complanatum* of Cole); Ground-cedar.

Diphasiastrum tristachyum (Pursh) Holub; Ground-cedar; probably included in *L. complanatum* of Cole; 14 Jun 1899 (MICH).

Huperzia lucidula (Michx.) R. Trevis. (*Lycopodium lucidulum* of Cole); Shining Clubmoss; 1 Sep 1893 (MICH); *Skeels, Shaddick, B. E. Livingston, & Fyfe* s.n., 21 Jul 1895 (MICH, MSC).

Lycopodium clavatum L.; Running Ground-pine; 1 Sep 1893 (MICH).

ONOCLEACEAE (Sensitive Fern Family)

Matteuccia struthiopteris (L.) Todaro (*Onoclea struthiopteris* of Cole); Ostrich Fern; 20 Aug 1890 (MICH).

Onoclea sensibilis L.; Sensitive Fern; *H. M. Bailey* s.n., 15 Jun 1891 (MICH).

OPHLOSSACEAE (Adder's-tongue Family)

Botrypus virginianus (L.) Michx. (*Botrychium virginianum* of Cole); Rattlesnake Fern; 15 Jun 1878 (MICH); *H. M. Bailey* s.n., 21 Jul 1892 (MICH); *Mulliken* s.n., 4 Jun 1895, 4 Jul 1895 (MICH); *Shaddick, Fyfe, Mulliken & E. J. Cole* s.n., 23 May 1897 (MSC).

Sceptridium multifidum (S. G. Gmel) M. Nishida (*Botrychium ternatum* of Cole); Leather Grape-fern; *Skeels & B. E. Livingston* s.n., 29 Aug 1897.

Sceptridium oneidense (Gilbert) Holub (*Botrychium ternatum* of Cole); Blunt-leaved Grape-fern; 10 Sep 1898 (MICH); *Skeels & Shaddick* s.n., 27 Aug 1897 (MSC).

OSMUNDACEAE (Royal Fern Family)

Osmunda claytoniana L.; Interrupted Fern; 20 May 1878 (MICH).

Osmunda regalis L.; Royal Fern; 25 May 1888 (MICH); *H. M. Bailey* s.n., 6 Jul 1892 (MICH).

Osmundastrum cinnamomeum (L.) Presl.; Cinnamon Fern; 15 May 1892, 15 May 1898 (MICH).

PTERIDACEAE (Maidenhair Fern Family)

Adiantum pedatum L.; Maidenhair Fern; 20 Sep 1898 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC).

SELAGINELLACEAE (Spikemoss Family)

Selaginella eclipses W. R. Buck (*S. apus* of Cole); Selaginella; 26 Jun 1896 (MICH); *C. W. Fallass* s.n., 7 Jul 1897 (MSC).

Selaginella rupestris Spring.; Sand Clubmoss; 20 Aug 1896, 25 Aug 1896 (MICH).

THELYPTERIDACEAE (Marsh Fern Family)

Phegopteris hexagonoptera Fée; Broad Beach-fern; *H. M. Bailey* s.n., 11 Jun 1892 (MICH); *Skeels* s.n., 7 Aug 1896 (MSC).

Thelypteris noveboracensis (L.) Nieuwl. (*Aspidium noveboracense* of Cole); New York Fern; 5 Jul 1978, 10 Sep 1978, 3 Aug 1899 (MICH).

Thelypteris palustris Schott (*Aspidium thelypteris* of Cole); Marsh Fern; 1 Sep 1888, 19 Aug 1897 (MICH).

GYMNOSPERMS

CUPRESSACEAE (Cypress Family)

Juniperus communis L.; Common Juniper, Ground Juniper.

Juniperus virginiana L.; Red Cedar; *H. M. Bailey* s.n., 7 Jul 1892 (MICH).

Thuja occidentalis L.; White Cedar, Arbor Vitae; *Skeels, Shaddick, Fyfe, and B. E. Livingston* s.n., 21 Jul 1895 (MICH).

PINACEAE (Pine Family)

Larix laricina (Du Roi) K. Koch (*Larix americana* of Cole); Tamarack, Larch; 10 May 1895 (MICH); *Shaddick & Fyfe* s.n. 25 May 1895 (as *L. americana*) (MICH, MSC).

Picea mariana (Mill.) Britton, Sterns & Poggenb. (*Picea nigra* of Cole); Black Spruce; 1 Jul 1897 (MICH).

Pinus strobus L.; White Pine. 18 Jun 1893 (ALBC); *Skeels* s.n., 26 Jan 1896 (MSC).

Pinus sylvestris L.; Scotch Pine, Scots Pine; 18 Jun 1893 (MICH); *Mulliken* s.n. 22 May 1897 (MICH). Despite Mulliken's collection, Cole did not include this cultivated European pine in her *Flora*; it is now a commonly naturalized species.

Tsuga canadensis Carrière; Hemlock, Eastern Hemlock; *Cole* s.d., Jenson, Ottawa Co. (MICH); *Skeels, Shaddick, Fyfe, B. E. Livingston* s.n., 21 Jul 1895 (MICH, MSC).

TAXACEAE (Yew Family)

Taxus canadensis Willd.; Canada Yew; 10 Jul 1896, 3 Jul 1899 (MICH).

ANGIOSPERMS / FLOWERING PLANTS

MONOCOTS

ACORACEAE (Sweet-flag Family)

Acorus americanus (Raf.) Raf. (*Acorus calamus* of Cole and of Voss); Sweet-flag; the Eurasian *A. calamus* sensu stricto was not documented in Michigan until 1913, in Oakland Co.; 16 Jul 1899 (ALBC); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC).

ALISMATACEAE (Water-plantain Family)

Alisma triviale Pursh (*Alisma plantago-aquatica* of Cole and of Voss), now segregated from the Eurasian *A. plantago-aquatica*; Northern Water-plantain; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 15 Jul 1892 (MICH); *Sones* s.n., 19 Jul 1890 (MICH).

Alisma subcordatum Raf. (*Alisma plantago-aquatica* of Cole and of Voss); Southern Water-plantain; *Mulliken* s.n., 21 Jul 1897 (MICH).

Sagittaria cuneata E. Sheld. (*Sagittaria arifolia* Nutt. of Cole); Arum-leaved Arrowhead.

Sagittaria cristata Engelm.; Crested Arrowhead; *Skeels & Shaddick* s.n., 19 Jul 1895 (as *S. graminea*) (MICH, MSC); *Hyser* s.n., 30 Sep 1899 (MICH).

Sagittaria graminea Michx.; Grass-leaved Arrowhead; 26 Aug 1896 (MICH); *Skeels* s.n., 19 Jul 1895 (MSC).

Sagittaria latifolia Willd.; Wapato, Duck-potato, Common Arrowhead; 25 Jul 1893, 1 Sep 1893, 23 Jul 1898, 30 Jul 1898 (MICH); *H. M. Bailey* s.n., 24 Jul 1891 (MICH); *Skeels* s.n., 19 Jul 1895, 1 Sep 1895 (as *S. variabilis angustifolia*) (MSC); *Skeels & Shaddick* s.n., 1 Sep 1895 (MICH).

Sagittaria rigida Pursh; Stiff Arrowhead; 26 Aug 1898 (as *S. graminea*) (MICH); *Mulliken* s.n., 10 Aug 1897 (MICH).

ALLIACEAE (Onion Family)

Allium canadense L.; Wild Garlic; 30 May 1896 (MICH); *Mulliken* s.n., 8 Jun 1895 (MICH).

Allium tricoccum Aiton; Ramps, Wild Leek; *M. B. Fallass* s.n., 30 Jun 1894 (MICH); *Skeels* s.n., 7 Aug 1896 (MICH).

ARACEAE (Arum Family)

Arisaema dracontium (L.) Schott; Green Dragon, Dragon-Root; 7 Jun 1891 (MICH); *Mulliken* s.n., 24 May 1896 (MICH, MSC); *Shaddick, Mulliken, Fyfe* s.n., 24 May 1896 (MSC). Cole's (1962) very interesting paper on the life history of *Arisaema dracontium*, although in preparation during 1898–1907, was posthumously published in *The Michigan Botanist* after having been discovered by E. G. Voss in the effects of Dr. Harriet Bartlett following her death (see footnote in Cole's paper). In his footnote Voss, an editor with an especially critical eye, noted that the paper required almost no editorial changes. Apparently he was unaware of the editorial assistance provided by B. L. Robinson, the editor of *Rhodora*. In a letter to Dr. Robinson, Cole stated: "I have about finished my observations

on *Arisaema Dracontium*. I spoke to you about my study of it when I saw you several years ago. You may have forgotten it however. If you can command the time will you kindly look over the manuscript which is not long and suggest other observations and criticise [sic] savagely the manuscript with its observations." (Emma J. Cole, Nov. 1, 1907, unpublished letter in Gray Herbarium Archives). One can only wonder why the manuscript had not been published in *Rhodora*.

Arisaema triphyllum (L.) Schott; Jack-in-the-pulpit, Indian-turnip; *H. M. Bailey* s.n., 2 May 1891 (MICH); *Mulliken* s.n., 10 May 1895 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895 (MSC).

Calla palustris L.; Wild Calla, Water-arum; 28 Jun 1894, 18 Jul 1898 (MICH); *L. J. Cole* s.n., 10 May 1896 (MSC).

Lemna minor L.; Common Duckweed. Although Cole's *Flora* states that this species is common, there are no specimens documenting this species from the *Flora* area; a specimen from east Cedar Springs, about 6 miles north of the *Flora* area (*C. W. Fallass* s.n., 23 Aug 1896, ALBC) does confirm its early presence in Kent County. The very similar, and more recently described, *Lemna turionifera* has also been also been documented for Kent County; it was surely present in Cole's day.

Lemna trisulca L.; Star Duckweed; 22 Oct 1892 (MICH); *M. B. Fallass* s.n., 10 Jun 1895 (ALBC); *Skeels & Shaddick* s.n., 14 Aug 1896 (MSC).

Peltandra virginica (L.) Schott & Endl. (*Peltandra undulata* of Cole); Arrow Arum, Tuckahoe; 21 June 1896 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1895 (MSC).

Spirodela polyrhiza (L.) Schleid. (*Lemna polyrrhiza* of Cole); Greater Duckweed, Duckmeat; 19 Jun 1896, 1 Jul 1899 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1896, 14 Aug 1896 (MICH).

Symplocarpus foetidus (L.) Nutt.; Skunk-Cabbage; 5 Apr 1893 (GH); *H. M. Bailey* s.n., 4 May 1892 (MICH); *Skeels & Shaddick* s.n., 12 Apr 1896 (MSC).

Wolffia borealis (Engelm.) Gandhi, Wiersema & Brouillet (*Wolffia brasiliensis* of Cole); Dotted Water Meal; 1 Jul 1899 (MICH).

Wolffia columbiana H. Karst; Common Water Meal; 1 Jul 1899 (MICH); 4 Jul 1899 (MSC); 29 Sep 1899 (MICH).

ASPARAGAE (Asparagus Family)

Asparagus officinalis L.; Garden Asparagus; *M. B. Fallass* s.n., s.d., (MICH); *Skeels & Shaddick* s.n., 30 May 1896 (MSC).

COMMELINACEAE (Spiderwort Family)

Tradescantia ohiensis Raf.; Ohio Spiderwort (*Tradescantia virginica* of Cole); 10 Jul 1893 (MICH); *H. M. Bailey* s.n., 4 Jul 1892 (MICH); *Mulliken* s.n., 17 Jun 1897 (MICH); *Shaddick & Fyfe* s.n., 23 Jun 1895 (MSC); *Skeels* s.n., 26 Jul 1895 (MSC); *Skeels & Shaddick* s.n., 28 Jul 1895 (MICH, MSC). Gray's Manual (Gray et al. 1890) did not include *T. ohiensis*, hence Cole's inclusion of *T. virginica* in her *Flora* was based on specimens only later annotated as *T. ohiensis*.

CONVALLARIACEAE (Lily-of-the-valley Family)

Clintonia borealis (Aiton) Raf.; Bluebead Lily, Corn-lily; *Skeels & Shaddick* s.n., 19 May 1895 (MSC).

Maianthemum canadense Desf.; Canada Mayflower, False Lily-of-the-valley; *H. M. Bailey* s.n., 23 May 1891 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MICH), 25 May 1895 (MSC).

Maianthemum racemosum (L.) Link (*Smilacina racemosa* of Cole and of Voss); False Spike-nard; 20 May 1894, 1 Jun 1895 (MICH); *H. M. Bailey* s.n., 23 May 1891, 7 Jul 1893 (MICH).

Maianthemum stellatum (L.) Link (*Smilacina stellata* of Cole and of Voss); Starry False Solomon-seal; 25 May 1893 (MICH); *H. M. Bailey* s.n., 23 May 1891 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MSC) *Sones* s.n., 18 May 1889 (MICH).

Maianthemum trifolium (L.) Sloboda (*Smilacina trifolia* of Cole and of Voss); False Mayflower; 8 Jul 1896 (MICH).

Medeola virginiana L.; Indian Cucumber-root; 30 Jul 1893 (MICH); *H. M. Bailey* s.n., 3 Jun

1892 (MICH); *Mulliken* s.n., 24 May 1896 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895, May 24 1896 (fls.) and 27 Aug 1897 (fr., same sheet), 27 Aug 1897 (MSC).

Polygonatum biflorum (Walter) Elliott (*P. giganteum* of Cole); Solomon-seal; 27 Jun 1893 (MICH); *H. M. Bailey* s.n., 27 Jun 1892, 7 Jul 1893 (MICH); *Mulliken* s.n., 6 Jul 1895 (MICH).

Polygonatum pubescens (Willd.) Pursh (*Polygonatum biflorum* of Cole); Downy Solomon-seal; *Skeels & Shaddick* s.n., 21 Jul 1895, 16 Jul 1897 (MSC).

Triantha glutinosa (Michx.) Baker (*Tofieldia glutinosa* of Cole and of Voss); False Asphodel; *S. O. Livingston* s.n., 15 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC); *Sones* s.n., 18 Jul 1889 (MICH).

Uvularia grandiflora Sm.; Bellwort; 1 May 1893 (MICH); *H. M. Bailey* s.n., 17 May 1891 (MICH); *Sones* s.n., 30 Apr 1889 (MICH).

CYPERACEAE (Sedge Family)

Bulbostylis capillaris (L.) C. B. Clarke (*Fimbristylis capillaris* of Cole); Sedge; 10 Jul 1896, 10 Jul 1899, 1 Sep 1899 (MICH).

Carex alata Torr. (*Carex straminea alata* of Cole); Winged Sedge; 20 Jun 1897 (MICH).

Carex albicans Spreng. (*Carex varia* of Cole; *C. emmonsii* of Voss) Sedge; 6 May 1897 (MICH); *Wheeler* s.n., 16 May 1895 (BLH, MSC).

Carex albursina E. Sheld.; Sedge; *Mulliken* s.n., 23 May 1897 (MICH); *Shaddick, Fyfe, Mulliken & E. J. Cole*, s.n., 23 May 1897 (as *C. laxiflora latifolia*) (MSC).

Carex alopecoidea Tuck.; Sedge; 5 Jun 1897 (MICH).

Carex aquatilis Wallenb.; Sedge; 29 May 1897, 4 Jun 1899 (MICH); *C. F. Wheeler* s.n., 16 May 1895 (MICH).

Carex arctata Boott; Sedge; 20 May 1898, 2 Jul 1899 (MICH).

Carex atherodes Spreng. (*Carex monile* of Cole); Sedge; 30 May 1897 (MICH).

Carex aurea Nutt.; Sedge; 1 Jul 1897, 5 Jul 1899, 13 Jul 1899 (MICH).

Carex bebbii (L. H. Bailey) Fernald (*Carex tribuloides bebbii* of Cole); Sedge; 6 Jul 1897 (MICH).

Carex blanda Dewey (*Carex laxiflora striatula* and *C. laxiflora varians* of Cole); Sedge; 10 May 1894, 3 Jun 1894, 2 May 1896, 10 Jun 1897, 19 Jun 1900 (MICH); *C. W. Fallass* s.n., 19 May 1894 (ALBC); *Mulliken* s.n., 16 May 1896 (MICH); *Wheeler* s.n., 15 May 1895 (MICH).

Carex bromoides Willd.; Sedge; 1898 (as *C. teretiuscula ramosa*) (ALBC); 6 May 1896, 6 May 1899 (MICH); *C. W. Fallass* s.n., 10 May 1895 (ALBC); *Mulliken* s.n., 23 May 1897 (MICH); *Wheeler* s.n., 16 May 1895 (MICH).

Carex brunnescens (Pers.) Poir. (*Carex canescens vulgaris* of Cole); Sedge; 16 May 1896, 5 Jun 1897 (MICH); 8 Jul 1897 (ALBC).

Carex buxbaumii Wahlenb.; Sedge; 10 Jun 1897 (as *C. fusca*) (MICH).

Carex canescens L.; Sedge; 17 May 1896, 5 May 1898 (MICH); *C. W. Fallass* s.n., 17 May 1895 (ALBC).

Carex careyana Dewey; Sedge; 30 Apr 1896, 18 May 1899, 18 May 1899 (MICH); *Mulliken* s.n., 22 May 1897 (MICH, MSC); *Shaddick, Fyfe, Mulliken & E. J. Cole*, s.n., 23 May 1897 (MSC); *C. F. Wheeler* s.n., 16 May 1895 (MICH).

Carex cephaloidea (Dewey) Dewey; Sedge; 25 May 1897, 19 Jun 1897 (MICH); *C. W. Fallass* s.n., 15 May 1894 (ALBC).

Carex cephalophora Willd.; Sedge; 19 May 1894, 20 Jun 1894, 19 May 1896, s.n., 1899 (misidentified as *C. gravida*, a name not included in *her Flora*) (MICH); *C. W. Fallass* s.n., 2 May 1894 (ALBC).

Carex communis L. H. Bailey; Sedge; 26 Apr 1896, 2329 May 1898; 29 May 1893 (as *C. communis Wheeleri*) (MICH); *Mulliken* s.n., 2 May 1896, 22 May 1897 (MICH); *Shaddick, Fyfe, Mulliken & E. J. Cole*, s.n., 23 May 1897 (MICH, MSC); *Wheeler* s.n., 5 Jun 1897.

Carex comosa Boott; Sedge; 5 Jun 1896 (as *C. pseudo-cyperus americana*); 19 Jun 1896, 6 Jun 1897 (MICH); *Mulliken* s.n., 16 Jun 1897 (MICH).

Carex conoidea Willd.; Beauty Sedge; *C. W. Fallass* s.n., 9 Jun 1898 (ALBC), from Fallassburg just three miles east of Cole's *Flora* area; no Cole specimen is extant, but her *Flora* references a C.F. Wheeler specimen at M.A.C. (but no Wheeler specimen was found at

- MSC nor at MICH). Two specimens were collected by Bazuin in 1951 (MSC) from Kent Co., Alaska and Campau Lake, the latter a collecting site of Cole's.
- Carex crinita* Lam.; Sedge; 16 May 1896 (MICH).
- Carex cristatella* Britton; Sedge; 16 Jun 1897 (as *C. tribuloides cristata*) (MICH). This specimen was very recently reexamined by A. A. Reznicek (pers. comm. 2017), and although immature the plant has been annotated as *C. cristatella*.
- Carex cryptolepis* Mack.; Sedge; 6 Jul 1897 (as *C. flava*) (MICH).
- Carex davisii* Schwein. & Torr.; Davis' Sedge; 9 Jul 1897 (MICH). Cole notes "Rare in Mich." **SPECIAL CONCERN.**
- Carex debilis* Michx.; Swamp Sedge; not included in the *Flora*, but Cole's collection on 1 Jul 1899 (MICH) is annotated by K. K. Mackenzie as *C. debilis* var. *rudgei*.
- Carex deweyana* Schwein.; Sedge; 12 Jun 1897, 20 Jun 1897, 17 May 1899 (MICH).
- Carex digitalis* Willd.; Sedge; 30 May 1878, 2 Jul 1896, 12 Jun 1897 (as *C. digitalis copulata*), 12 Jun 1897 (as *C. hitchcockiana*), 22 Jun 1897 (MICH).
- Carex disperma* Dewey (*C. tenella* of Cole); Sedge.
- Carex echinata* Murray (*C. cephalantha* and *C. angustior* of Voss); Sedge; not included in Cole's *Flora* since *C. W. Fallass* s.n., 5 Jun 1897 (MO) had been misidentified as *C. sterilis*.
- Carex emoryi* Dewey; Sedge; 19 May 1897 (MICH); *C. F. Wheeler* s.n., 16 May 1895 (as *C. varia*) (MSC).
- Carex flava* L.; Sedge; 12 Jun 1897, 20 Jun 1897, 17 May 1899 (MICH); *Mulliken* s.n., 19 Jun 1892 (MICH).
- Carex formosa* Dewey; Sedge; *C. F. Wheeler* s.n., 16 May 1895 (BLH, MICH, MSC).
- Carex gracilescens* Steud.; Sedge; 13 May 1895 (as *C. laxiflora*) (MICH); *Wheeler* s.n., 16 May 1895 (OS).
- Carex gracillima* Schwein.; Sedge; 27 May 1894, 12 Jun 1897 (MICH); *C. W. Fallass* s.n., May 1894 (ALBC); *Mulliken* s.n., 19 Jun 1897 (MICH).
- Carex granularis* Willd. (including *C. granularis haleana* of Cole); Sedge; 31 May 1896, 19 Jun 1899 (MICH); *Mulliken* s.n., 9 May 1896 (MICH).
- Carex grayi* J. Carey; Sedge; 17 Jun 1892, 6 Jul 1897, 6 Jul 1897, 21 Jul 1897, 21 Jul 1897 (MICH).
- Carex grisea* Wahlenb.; Sedge; 3 May 1876 (MICH).
- Carex hirsutella* Mack.; (*Carex triceps hirsuta* of Cole); Sedge; 18 Jun 1898 (MICH).
- Carex hirtifolia* Mack. (*Carex pubescens* of Cole); Sedge; 29 May 1898, 20 May 1899 (MICH); *C. W. Fallass* s.n., 26 May 1894 (ALBC); *Wheeler* s.n., 16 May 1895 (MICH).
- Carex hitchcockiana* Dewey; Sedge; 17 May 1899, 4 Jan 1899 (MICH); *C. W. Fallass* s.n., 29 May 1894 (ALBC); *Wheeler* s.n., 16 May 1895 (MICH).
- Carex hystericina* Willd.; Sedge; 3 Jul 1893, 17 May 1894, 10 Jul 1894 (MICH); 10 Jul 1894 (MSC); 22 May 1896, 2 May 1896 (MICH); *C. W. Fallass* s.n., May 1894 (ALBC).
- Carex interior* L. H. Bailey; Sedge; 19 May 1893 (as *C. echinata microstachys*), 20 Jun 1899 (MICH); *Mulliken* s.n., 18 May 1896 (ALBC), 9 May 1896 (MICH).
- Carex intumescens* Rudge; Sedge; 30 May 1894, 10 Jun 1894, 11 Jul 1896 (MICH); *Mulliken* s.n., 23 May 1897, 19 Jun 1897 (MICH); *Shaddick, Fyfe, Mulliken & E. J. Cole*, 23 May 1897 (MSC); *Skeels & Shaddick* s.n., 23 May 1897 (MSC).
- Carex lacustris* Willd. (*Carex riparia* of Cole); Sedge; 8 Jul 1893 (MICH); *Wheeler* s.n., 17 May 1895 (MICH).
- Carex laevivaginata* (Kük) Mack.; Sedge; 20 Jun 1894 (as *Carex stipata*) (MICH).
- Carex lasiocarpa* Ehrh. (*Carex filiformis* of Cole); Sedge; 22 May 1896, 30 May 1897, 4 Jun 1899 (MICH); *C. W. Fallass* s.n., 13 May 1895 (ALBC); *Wheeler* s.n., 17 May 1895 (MICH).
- Carex laxiculmis* Schwein. (*Carex digitalis copulata* of Cole); Sedge; *Wheeler* s.n., 17 May 1895 (MSC); *Wheeler* s.n., 16 May 1895 (MICH, MSC, OS).
- Carex laxiflora* Lam. (*Carex laxiflora patulifolia* of Cole); Sedge; 27 May 1894, 18 May 1898 (MICH).
- Carex leptalea* Wahlenb.; Sedge (*Carex polytrichoides* of Cole); 2 May 1896 (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC).

- Carex leptoneuria* (Fernald) Fernald; Sedge; *C. W. Fallass* s.n., 25 May 1894 (as *C. laxiflora varians*) (ALBC).
- Carex limosa* L.; Sedge; 6 Jul 1897 (MICH); *Wheeler* s.n., 22 May 1896 (MICH).
- Carex lupulina* Willd.; Sedge; 28 Jun 1894, 7 Jul 1897 (MICH); 11 Jul 1896, 28 Jul 1897 (as *C. lupulina pedunculata*); 12 Jun 1894, 29 May 1898 (as *Carex trichocarpa*) (MICH); *Mulliken* s.n., 25 Jun 1895 (MICH).
- Carex lurida* Wahlenb.; Sedge; 20 Jun 1897, 12 Jul 1897 (MICH); 5 Jul 1897 (ALBC).
- Carex meadii* Dewey (*Carex tetanica* of Cole and of Voss); Sedge; 29 May 1897, 4 Jun 1899, 8 Jun 1899 (MICH); *Wheeler* s.n., 16 May 1895 (MICH).
- Carex molesta* Mack. (*Carex straminea brevior* of Cole); Sedge; 24 Jun 1897, 8 Jun 1899, 8 Jun 1899 (as *C. festucacea brevior*) (MICH); *C. W. Fallass* s.n., 8 Jun 1894 (ALBC).
- Carex muehlenbergii* Willd.; Sedge; 25 May 1897, 20 Jun 1897, 21 Jul 1897, s.d. 1899 (as *C. grvida*) (MICH).
- Carex muskingumensis* Schwein.; Sedge; 23 Jul 1896 (MICH); *Hyser* s.n., s.d., (BLH), 16 Aug 1899 (MICH).
- Carex normalis* Mack.; Sedge; 12 Jun 1897 1 Jul 1899 (both as *C. straminea*) (MICH).
- Carex oligosperma* Willd.; Sedge; 13 Aug 1893 (ALBC); 3 Sep 1893 (MICH).
- Carex pauciflora* Lightf.; Sedge; 6 Jul 1897 (MICH).
- Carex pedunculata* Willd.; Sedge; 22 May 1896, 6 May 1898 (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC); *Wheeler* s.n., 15 May 1895 (ALBC).
- Carex pellita* Willd., (*Carex lanuginosa* of Cole and of Voss); Sedge; 4 June 1899 (MICH); 25 Jun 1894, 16 May 1896 (as *C. filiformis latifolia*) (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC).
- Carex pennsylvanica* Lam.; Sedge; s.d. 1890, 1 May 1894 (MICH); *H. M. Bailey* s.n., 30 Apr 1892 (MICH).
- Carex plantaginea* Lam.; Sedge; Jun 1896, 26 Apr 1896, 6 May 1899, 15 May 1899 (as *C. careyana*) (MICH).
- Carex prairea* Dewey (*Carex teretiuscula* of Cole); Sedge; 19 May 1894, 10 Jun 1894 (MICH); *H. M. Bailey* s.n., s.d. (MICH); *C. W. Fallass* s.n., 17 May 1895 (ALBC); *Mulliken* s.n., 9 May 1896 (MICH); *Wheeler* s.n., 22 May 1896 (MICH).
- Carex pseudo-cyperus* L.; Sedge; 9 Jul 1896 (MICH); *C. W. Fallas* s.n., 8 July 1897 (MSC).
- Carex radiata* (Wallenb.) Small (*Carex rosea radiata* of Cole; *C. rosea* of Voss); Sedge; 2 May 1896 (as *C. polytrichoides*) (MICH); *C. W. Fallass* s.n., 8 Jul 1897 (MSC); *Wheeler* s.n., 22 May 1896 (MICH).
- Carex rosea* Willd. (*Carex convoluta* of Voss); Sedge; 27 May 1890, 27 May 1894, 30 May 1894 (MICH); 30 May 1894 (MSC); *Mulliken* s.n., 22 May 1897 (MICH); *Wheeler* s.n., 16 May 1895 MICH).
- Carex retrorsa* Schwein.; Sedge; 19 Jun 1897 (as *C. lurida*), 20 Jun 1897 (MICH).
- Carex sartwellii* Dewey; Sedge; 30 May 1897, 11 Jun 1898 (MICH).
- Carex scabrata* Schwein.; Sedge; 18 Jun 1897, 4 Jun 1899, 19 May 1900 (MICH).
- Carex scoparia* Willd.; Sedge; 20 Jul 1893, 16 May 1896, 19 Jun 1897, 1 Jul 1897 (as *C. straminea ferruginea*), 8 Jun 1899, 9 Jul 1899, 16 Jul 1899 (MICH).
- Carex siccata* Dewey (*Carex foenea* of Voss); Sedge; 20 Jun 1899, 20 Jun 1899, 20 Jul 1899 (MICH).
- Carex sparganioides* Willd.; Sedge; 10 Jul 1893, 2 Jun 1895, 15 Jul 1897 (MICH); 29 May 1898 (MSC); 22 May 1892 (MICH); *M. B. Fallass* s.n., 8 May 1898 (ALBC).
- Carex sprengelii* Spreng. (*Carex longirostris* Torr. of Cole); Sedge; *C. W. Fallass* s.n., 15 May 1895 (ALBC).
- Carex sterilis* Willd. (*Carex sterilis cephalantha* of Cole); Sedge; 20 May 1894 (as *C. echinata cephalantha*), 19 May 1897 (MICH); *Mulliken* s.n., 18 May 1896 (MICH); *Wheeler* s.n., 16 May 1895 (BHL, MICH, MSC), s.n., s.d. (Burton Ave. Swamp) (MICH).
- Carex stipata* Willd.; Sedge; 19 May 1894 (MICH); *C. W. Fallass* s.n., 11 May 1894, 26 May 1894 (ALBC); *M. B. Fallass* s.n., Aug 1894 (ALBC); *Mulliken* s.n., 4 May 1896, 18 May 1896 (MICH); *Mulliken & L. J. Cole* s.n., 4 May 1896 (MICH).
- Carex stricta* Lam.; Sedge; 5 May 1894 (MICH); *C. W. Fallass* s.n., 7 May 1894 (ALBC); *Mulliken* s.n., 4 May 1896 (MICH).

- Carex swanii* (Fernald) Mack.; Sedge; 10 July 1894, 1 Jul 1897 (both as *C. virescens*) (MICH); *C. W. Fallass* s.n., 8 Jul 1897 (ALBC); *Wheeler* s.n., 5 Jun 1897 (MICH).
- Carex tenera* Dewey; Sedge; 30 Jun 1895 (as *C. straminea*) (MICH).
- Carex tenuiflora* Wahlenb.; Sedge; 16 May 1896 (MICH).
- Carex tetanica* Schkuhr.; Sedge; 19 May 1897, 29 May 1897 (MICH); *Mulliken* s.n., 22 May 1896 (MICH); *Wheeler* s.n., 16 May 1895 (MICH).
- Carex tribuloides* Wahlenb. (*Carex tribuloides reducta* of Cole); Sedge; 5 May 1896, 11 Jul 1897, 29 Jun 1899 (MICH).
- Carex trisperma* Dewey; Sedge; 4 Apr 1895, 5 Jun 1896 (as *C. tenella*), 17 Jun 1897, 11 Jun 1898 (MICH); *Mulliken* s.n., 19 Jun 1897 (MICH).
- Carex tuckermanii* Dewey; Sedge; 6 Jul 1897, 6 Jul 1897 (MICH); *Wheeler* s.n., 5 Jun 1897 (MICH).
- Carex utriculata* Boott; Sedge; 10 Jun 1899 (MICH).
- Carex virescens* Willd.; Sedge; 15 Jul 1897 (MICH).
- Carex viridula* Michx.; Sedge; 23 May 1897 (as *C. flava graminis*), 21 Jun 1897 (as *C. flava viridula*), 21 Jun 1897 (as *C. flava pumila*) (MICH).
- Carex vulpinoidea* Michx.; Sedge; 20 Jun 1894 (ALBC); 20 Jun 1894, 12 Jul 1897 (MICH); 20 Jun 1894 (MSC); *Mulliken* s.n., 27 Jun 1896 (ALBC); *Mulliken & L. J. Cole* s.n., 24 Jun 1896 (MICH).
- Carex woodii* Dewey; Sedge; 9 May 1897 (as *C. tetanica woodii*), 18 May 1898 (as *C. laxiflora*) (MICH).
- Cladium mariscoides* (Muhl.) Torr.; Twig-rush; 12 Aug 1896, 11 Jul 1898, 6 Jul 1899 (MICH); 25 Sep 1898 (MSC).
- Cyperus bipartitus* Kunth (*Cyperus diandrus castaneus* of Cole; *C. rivularis* of Voss); Brook Nut Sedge; 1 Aug 1893 (ALBC); 25 Aug 1873, 30 Jul 1897, 30 Sep 1899 (MICH); 1 Aug 1893 (MSC); *Sones* s.n., 16 Aug 1891 (MICH, MO).
- Cyperus diandrus* Steud.; Umbrella Sedge; 30 Jul 1897, 12 Aug 1899 (MICH).
- Cyperus engelmannii* Steud.; Umbrella Sedge; 4 Sep 1899 (as *C. speciosus*), 4 Sep 1899, 11 Sep 1899 (as *C. erythrorhizos*), 22 Aug 1900 (as *C. speciosus*) (MICH).
- Cyperus erythrorhizos* Muhl.; Umbrella Sedge; 4 Sep 1899 (as *C. speciosus*) (MICH).
- Cyperus esculentus* L.; Yellow Nutsedge; 26 Jun 1894, 5 Aug 1894, 7 Sep 1899 (MICH); *Mulliken* s.n., 18 Jul 1896 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC); *Sones* s.n., 27 Aug 1891 (MICH, MO).
- Cyperus lupulinus* (Spreng.) Marcks (*Cyperus filiculmis* of Cole and of Voss); Slender Sand Sedge; 20 Jul 1894 (ALBC); 20 Jul 1893 (MICH); 10 Jul 1894 (MSC); *Mulliken* s.n., 24 Jun 1896 (MICH); *Sones* s.n., 30 Aug 1891 (MICH).
- Cyperus odoratus* L.; Umbrella Sedge; 4 Sep 1899 (as *C. speciosus*), 4 Sep 1899 (as *C. speciosus*), 4 Sep 1899 (as *C. engelmannii*), 12 Sep 1899 (as *C. erythrorhizos*) (MICH).
- Cyperus squarrosus* L. (*Cyperus aristatus* of Cole and of Voss); Umbrella Sedge; 3 Sep 1899, 3 Sep 1899 (MICH).
- Cyperus strigosus* L.; Long-Scaled Nut-Sedge; 9 Sep 1897, 20 Aug 1899 (as *C. erythrorhizos*), 4 Sep 1899 (as *C. speciosus*), 5 Sep 1899 (as *C. speciosus*), 5 Sep 1899, 5 Sep 1899, 27 Sep 1899 (MICH).
- Dulichium arundinaceum* (L.) Britton (*Dulichium spathaceum* of Cole); Three-way Sedge; 10 Aug 1894 (MICH); 3 Aug 1894 (MSC).
- Eleocharis acicularis* (L.) Roem. & Schult.; Spike-rush; 6 Sep 1894, 10 Jun 1899 (MICH); *Mulliken* s.n., 12 Jul 1895 (MICH); *Sones* s.n., 12 Jul 1895 (MICH).
- Eleocharis compressa* Sull.; Flattened Spike-rush; *Daniels* s.n., 1 Jul 1898 (MSC).
- THREATENED.**
- Eleocharis elliptica* Kunth (*Eleocharis acuminata* of Cole); Golden-seeded Spike-rush; 27 May 1897 (as *E. tenuis*), 20 Jun 1897 (as *E. compressa*), 8 Jun 1899 (as *E. compressa*), 10 Jun 1899 (as *E. compressa*) (MICH); *C. W. Fallass* s.n., May 1894 (ALBC).
- Eleocharis erythropoda* Steud.; Spike-rush; 20 Jul 1873 (as *E. tenuis*), 9 Jul 1893 (as *E. palustris*), 20 Jul 1894 (mixed with *E. palustris*), 11 Jun 1899 (as *E. palustris*), 22 May 1899 (as *E. compressa*), 6 Jul 1899 (as *E. palustris glaucescens*) (MICH); 20 Jul 1894 (as *E. palustris*) (MSC); *Mulliken* s.n., 12 Jul 1895, 9 May 1896 (MICH).
- Eleocharis flavescens* (Poir.) Urb. (*Eleocharis olivacea* of Cole and of Voss); Spike-rush; 15

- Oct 1898 (ALBC); 15 Oct 1898 (BLH); 15 Oct 1898, 12 Aug 1899, 10 Sep 1899 (MICH); 15 Oct 1898 (MSC).
- Eleocharis intermedia* Schult.; Spike-rush; 11 Aug 1896, 11 Jul 1899, 13 Jul 1899, 4 Sep 1899, 5 Sep 1899, 10 Sep 1899, 29 Sep 1899 (MICH); Jul 1899, Jul 1899 (MSC); Sones s.n., 26 Aug 1891, 9 Oct 1891 (MICH).
- Eleocharis obtusa* (Willd.) Schult.; Spike-rush; 10 Aug 1893 (as *E. ovata*), 16 Sep 1898, 18 Jul 1899, 29 Aug 1899 (as *E. ovata*), 6 Sep 1899 (as *E. ovata*), 16 Oct 1899 (as *E. ovata*), 15 Oct 1899 (as *E. engelmannii*) (MICH); Mulliken s.n., 17 Sep 1897 (MICH).
- Eleocharis palustris* (L.) Roem. & Schult. (including *Eleocharis palustris glaucescens*, *E. palustris vigens* of Cole; *E. smallii* of Voss); Spike-rush; 20 Jul 1894 (MSC); 2 Jun 1895, 19 Jun 1895, 11 Jul 1898, 21 Jul 1898 (as *E. palustris glaucescens*), 8 Jun 1899 (as *E. palustris vigens*), 10 Jun 1899 (MICH); Shaddick, Fyfe, Mulliken, Wheeler & E. J. Cole s.n., 7 Jul 1897 (MSC).
- Eleocharis quadrangulata* (Michx.) Roem. & Schult. (*Eleocharis mutata* of Cole); Four-sided Spike-rush; 12 Jul 1897 (ALBC); 14 Jul 1899 (MICH); 12 Jul 1896 (MSC); Sones s.n., 6 Sep 1891 (MICH). This species has not been documented in Kent County subsequent to Cole's collections, all of which were from Reeds Lake.
- Eleocharis quinqueflora* (Hartmann) O. Schwarz (*Eleocharis pauciflora* of Voss); Spike-rush; 29 May 1899, 8 Jun 1899 (MICH); not included in Cole's *Flora*, although the specimens cited here are from the *Flora* area (Lamberton Lake, Kent Co., and Tallmadge Twp., Ottawa Co.).
- Eriophorum angustifolium* Honck.; Narrow-leaved Cotton-grass; 3 Jul 1896 (as *E. virginicum*) (MICH).
- Eriophorum gracile* W. D. J. Koch; Slender Cotton-grass; 29 May 1897, 30 May 1899 (MICH).
- Eriophorum viridi-carinatum* (Engelm.) Fernald (*Eriophorum polystachyon* of Cole); Green-keeled Cotton-grass; 19 May 1894, 8 Jun 1899 (MICH); 19 May 1894 (MSC); L. J. Cole s.n., 15 May 1895 (MSC); Shaddick & Fyfe s.n., 7 Jun 1896 (MSC).
- Eriophorum vaginatum* L. (*Eriophorum spissum* of Voss); Cotton-grass; 6 Jun 1898 (ALBC); 30 May 1899 (MICH); 20 May 1899 (MSC).
- Eriophorum virginicum* L.; Tawny Cotton-grass; 19 May 1894; 6 Sep 1899 (MICH); C. W. Fallass s.n., 19 May 1894 (ALBC); Skeels & Shaddick s.n., 2 Aug 1896 (MSC).
- Fimbristylis autumnalis* (L.) Roem. & Schult.; Autumn Sedge; 12 Aug 1896, 25 Aug 1898, 16 Sep 1898, 8 Oct 1898, 12 Aug 1899, 1 Sep 1899, 1 Sep 1899, 4 Sep 1899 (MICH).
- Fuirena pumila* Spreng. (*Fuirena squarrosa* var. *pumila* of Cole and of Voss); Umbrella-grass; 8 Oct 1898 (MICH). Cole indicated that this species is "rare," on the northwest side of Crooked Lake (now Dean Lake); houses now occupy the shore all around the lake. **THREATENED.**
- Lipocarpa micrantha* (Vahl) G. C. Tucker (*Hemicarpha subsquarrosa* of Cole; *H. micrantha* of Voss); Dwarf-bulrush; 17 Sep 1898 (ALBC); 16 Sep 1898, 28 Sep 1898, 16 Oct 1898 (MICH). **SPECIAL CONCERN.**
- Rhynchospora alba* (L.) Vahl; Beak-rush; 25 Jul 1894, 3 Aug 1897, 8 Jul 1898 (MICH); Mulliken s.n., 10 Aug 1895 (MICH).
- Rhynchospora capillacea* Torr.; Beak-rush; 8 Oct 1898 (ALBC), 3 Aug 1896, 8 Oct 1898, 10 Jul 1899 (MICH); 3 Aug 1896 (MICH); Mulliken s.n., 23 Aug 1897, 23 Aug 1897 (MICH).
- Rhynchospora capitellata* (Michx.) Vahl (*Rhynchospora glomerata* of Cole); Beak-rush; 1 Sep 1894 (ALBC); 1 Sep 1894, 10 Jul 1897, 8 Jul 1898, 21 Jul 1899 (MICH).
- Rhynchospora macrostachya* Torr.; Tall Beak-rush; 4 Sep 1899 (MICH); on the northwest side of Crooked Lake (now Dean Lake); houses now occupy the shore all around the lake. **SPECIAL CONCERN.**
- Rhynchospora scirpoides* (Torr.) Griseb. (*Psilocarya scirpoides* of Cole and of Voss); Bald-rush; 8 Oct 1898 (BLH); 30 Jul 1897 (as *Cyperus diandrus*), 8 Oct 1898, 12 Aug 1899 (as *Fimbristylis autumnalis*), 4 Sep 1899 (MICH); 8 Oct 1898, 8 Oct 1898 (MSC). Cole stated that this was the only known station in the state and that it was abundant in mud on the margin of Crooked Lake (now Dean Lake); houses now occupy the shore all around the lake. **THREATENED.**
- Schoenoplectiella purshiana* (Fernald) Lye (*Scirpus debilis* of Cole; included in *Scirpus*

smithii of Voss; *Schoenoplectus purshianus* of Voss and Reznicek); Pursh's Tufted Bulrush; 29 Sep 1899, 29 Sep 1899 (MICH).

Schoenoplectiella smithii (A. Gray) Lye (*Scirpus smithii* of Cole and of Voss; *Schoenoplectus smithii* of Voss and Reznicek); Bulrush; 17 Sep 1898 (ALBC); 17 Sep 1898, 28 Sep 1898, 8 Oct 1898, 17 Oct. 1898, 12 Aug 1899, 28 Aug 1899 (MICH), 29 Sep 1899 (as *Scirpus debilis*) (MSC).

Schoenoplectus acutus (Bigelow) Á. Löve & D. Löve (*Scirpus lacustris* of Cole; *Scirpus acutus* of Voss); Hardstem Bulrush; 19 Jun 1896, 30 Jun 1900 (MICH); *Mulliken* s.n., 4 Jun 1896 (MICH).

Schoenoplectus americanus (Pers.) Schinz & R. Keller (*Scirpus olneyi* of Cole and of Voss); Olney's Bulrush; 29 Jun 1899 (MICH); 20 Jun 1899 (MSC); *Mulliken* s.n., 20 Jun 1899 (MICH); apparently no longer extant in the Grand Rapids area (MICHIGAN FLORA ONLINE 2011). **ENDANGERED.**

Schoenoplectus pungens (Vahl) Palla (*Scirpus pungens* of Cole; *Scirpus americanus* of Voss); Threesquare; 8 Jun 1899, 9 Jul 1899 (MICH); *Hyser* s.n., 18 Jul 1898 (BLH).

Schoenoplectus torreyi (Olney) Palla (*Scirpus torreyi* of Cole and of Voss); Bulrush; 12 Aug 1896, 23 Aug 1900 (MICH). **SPECIAL CONCERN.**

Scirpus atrovirens Willd.; Bulrush; 7 Jun 1893 (ALBC); *M. B. Fallass* s.n., 1895 (ALBC); *Shadick & Fyfe* s.n., 17 Jun 1896 (MSC).

Scirpus cyperinus (L.) Kunth (as *Scirpus cyperinus eriophorum* of Cole); Wool-grass; *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC); *Sones* s.n., 13 Aug 1891 (MICH).

Scirpus expansus Fernald (*Scirpus microcarpus* of Cole); Bulrush; 21 Jul 1898 (as *S. sylvaticus digynus*) (MICH); *M. B. Fallass* s.n., Jun 1896 (ALBC), 20 Jun 1895 (MICH).

Scirpus pendulus Muhl. (*Scirpus lineatus* of Cole); Bulrush; 19 Jun 1894, 19 Jun 1899 (both as *Eriophorum lineatum*) (MICH); *B. E. Livingston* s.n., 7 Jul 1895 (as *Eriophorum lineatum*) (MSC); *Mulliken* s.n., 19 Jun 1897 (MICH).

Scleria verticillata Willd.; Nut-Rush; 8 Sep 1898, 5 Sep 1899, 5 Sep 1899 (MICH).

DIOSCOREACEAE (Yam Family)

Dioscorea villosa L.; Wild Yam; 28 Jun 1893, 28 Jun 1893, 5 Jul 1893 (MICH); *H. M. Bailey* s.n., 12 Jul 1892, 21 Jul 1892 (MICH).

ERIOCAULACEAE (Pipewort Family)

Eriocaulon aquaticum (Hill) Druce (*Eriocaulon septangulare* of Cole and of Voss); Pipewort; 12 Aug 1896, 30 Aug 1899, 1 Sep 1899 (MICH); 12 Aug 1896 (MSC).

HEMEROCALLIDACEAE (Day-lily Family)

Hemerocallis fulva L.; Common Day-lily; Cole noted as "escaped from gardens; occasional."

HYACINTHACEAE (Hyacinth Family)

Muscari botryoides (L.) Mill.; Grape-hyacinth; Cole noted that this is "escaped from gardens; occasional."

HYDROCHARITACEAE (Frog's-bit Family)

Elodea canadensis Michx.; Common Waterweed; *B. E. Livingston* s.n., 7 Aug 1895 (MSC).

Elodea nuttallii (Planch.) H. St. John; Slender Waterweed; 19 Jun 1896 (as *E. canadensis*) (MICH); *Skeels* s.n., 1 Sept. 1895 (MICH, MSC).

Najas flexilis (Willd.) Rostk. & Schmidt.; Slender Naiad; 11 Jul 1897, 30 Jul 1897, 29 Sep 1899 (MICH).

Vallisneria americana Michx. (*Vallisneria spiralis* of Cole); Tape-grass, Eel-grass, Wild-celery; 20 Jul 1896 (MICH); *Skeels* s.n., 19 Jul 1895 (MSC).

HYPOXIDACEAE (Star-grass Family)

Hypoxis hirsuta (L.) Coville (*Hypoxis erecta* of Cole); Star-Grass; 1 Jun 1893 (MICH); *H. M. Bailey* s.n., 23 May 1891 (MICH); *Skeels* s.n., 18 May 1895, *Shaddick & Fyfe* s.n., 25 May 1895 (MSC).

IRIDACEAE (Family)

Iris virginica L. (*Iris versicolor* of Cole); Southern Blue Flag; 29 Jun 1893 (MICH); *H. M. Bailey* s.n., Jun 1891 (MICH); *Mulliken* s.n., 6 Jun 1895 (MICH); *Skeels* s.n., 13 Jul 1895 (MSC).

Sisyrinchium albidum Raf.; Blue-eyed-grass; *Skeels & Shaddick* s.n., 29 May 1895 (MSC); *Sones* s.n., s.d., (MICH).

Sisyrinchium angustifolium Mill.; Stout Blue-eyed-grass; *Mulliken* s.n., 24 Aug 1892 (MICH).

Sisyrinchium strictum E. P. Bicknell; *M. B. Fallass* s.n., 30 May 1893 (as *S. angustifolium*) (MICH); *H. M. Bailey* s.n., 21 Jun 1891 (MICH). **SPECIAL CONCERN.**

JUNCACEAE (Rush Family)

Juncus acuminatus Michx.; Sharp-fruited Rush; 12 Aug 1896, 5 Jun 1896 (as *J. canadensis*), 6 Jul 1897, 8 Jul 1898 (as *J. articulatus*), 8 Jun 1899 (as *J. canadensis*), 29 Sep 1899 (MICH); *M. B. Fallass* s.n., 8 Jun 1899 (ALBC).

Juncus articulatus L.; Jointed Rush. Cole states: "Margin of Gold Lake [Quiggle Lake]; Round Lake. Rare in the State." This species is more common northward.

Juncus balticus Willd.; Rush; 10 Jun 1898 (MICH).

Juncus brachycephalus (Engelm.) Buchenau; Rush; 16 Sep 1898, 1 Sep 1899 (both as *J. canadensis coarctatus*), 20 Jun 1893, 30 Aug 1896, 1 Sep 1899, 10 Sep 1899 (all four as *J. canadensis brachycephala*) (MICH).

Juncus bufonius L.; Toad Rush; 11 Jun 1898, 26 Jun 1899, 6 Jun 1899 (MICH); *Mulliken* s.n., 9 Oct 1891 (MICH).

Juncus canadensis LaHarpe; Canadian Rush; 1 Jun 1896, 12 Aug 1896, 6 Aug 1897, 12 Oct 1898, 30 Aug 1899, 21 Jul 1899, 1 Sep 1899, 1 Sep 1899, 8 Sep 1899, 15 Oct 1899 (MICH); *Sones* s.n., 15 Aug 1891 (MICH); *Sones* s.n., 26 Aug 1891 (MICH).

Juncus dudleyi Wiegand; Dudley's Rush; 16 Sep 1898 (as *J. tenuis*) (MICH); 20 Jul 1894 (as *J. tenuis*) (MSC); *Mulliken* s.n., 19 Jun 1897 (MICH).

Juncus effusus L.; Soft-stemmed Rush; 1 Jul 1894 (MICH).

Juncus greenei Oakes & Tuck.; Greene's Rush; 23 Aug 1900 (MICH).

Juncus marginatus Rostk.; Grass-leaved Rush; Cole stated, "Grand Rapids (Prof. C.F.Wheeler). In M.A.C. Herbarium—destroyed by fire in 1890." A. A. Reznicek (pers. comm. 2017) suggests that there is a possibility that Wheeler's specimen could have been *J. biflorus*; there are presently no records of *J. marginatus* for Kent County in the MICH database whereas there are four older (1940s) localities from the Grand Rapids area for *J. biflorus* (MICHIGAN FLORA ONLINE 2011).

Juncus nodosus L.; Joint Rush; 16 Sep 1898 (MICH); 12 Jun 1897 (MICH).

Juncus pelocarpus E. Mey.; Brown-fruited Rush; 12 Aug 1896, 16 Sep 1893, 28 Sep 1898, 1 Sep 1899 (MICH).

Juncus pylaei Laharpe (*Juncus effusus* of Cole and Voss; *Pylaei's* Soft Rush; 20 Jun 1894 (MICH), annotated by Peter F. Zika in 2014 as *J. pylaei*; the taxon was included as only a comment under *J. effusus* in Voss and Reznicek (2012), but updated as a distinct species on MICHIGAN FLORA ONLINE (2011).

Juncus tenuis Willd.; Path Rush; 25 Jul 1893 (MICH); 20 Jul 1894 (as *J. macer*) (MSC); 19 Jun 1897 (MICH).

Juncus torreyi Coville; Torrey's Rush (*Juncus nodosus megacephalus* of Cole). Cole stated that there was a small patch by roadside between Alpine Twp., Secs. 5 and 6, on the farm of E. Miller. "Rare." Not considered rare today.

Luzula acuminata Raf. (*Luzula vernalis* of Cole); Hairy Wood Rush; *L. J. Cole* s.n., 20 Apr 1893 (MICH); *Mulliken* s.n., 8 May 1897 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MSC).

Luzula multiflora (Erhr.) Lej (*L. campestris* of Cole); Common Wood Rush; 25 May 1893 (MICH); *Mulliken* s.n., 13 May 1897 (MICH).

JUNCAGINACEAE (Arrow-grass Family)

Triglochin maritima L.; Common Bog Arrow-Grass; 29 May 1897, 21 Jun 1897 (MICH); *Skeels* s.n., 10 May 1895, *Skeels & Shaddick* s.n., 25 Aug 1894, 28 Jul 1895 (MSC).

Triglochin palustris L.; Slender Bog Arrow-Grass; 9 Jul 1897 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH); *Skeels* s.n., 10 May 1895 (MSC); *Skeels & Shaddick* s.n., 28 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895, 25 Aug 1897 (MSC).

LILIACEAE (Lily Family)

Erythronium albidum Nutt.; White Trout Lily; *H. M. Bailey* s.n., 30 Apr [1892] (MICH); *Matteson* s.n., 25 Apr 1893 (MSC). Cole notes that this species is “scarce” in rich woods, citing Indian Mounds, woods near the Glue Factory, Mill Creek woods, and a woods in Tallmadge Twp. Populations in rich woods by Reeds Lake and at Soldiers Home/Lamberton Creek Woods were documented as part of our project in 2016; both localities are areas that had been visited by Cole and her colleagues. Hattie M. Bailey’s collection is from Paris Twp., presumably along Plaster Creek, in a rich woods where she also collected *Dicentra canadensis*, *D. cucullaria*, *Claytonia virginica*, *Cardamine douglassii*, and *Carex pensylvanica* on 30 April 1892 (MICH) (Reznicek 2016, pers. comm).

Erythronium americanum (Aiton) Ker Gawl.; Yellow Trout Lily; 3 May 1893 (MICH); 20 Apr 1889 (MICH); *H. M. Bailey* s.n., 2 May 1891 (MICH); *Mulliken* s.n., 22 May 1897 (MICH); *Skeels & Shaddick* s.n., 23 May 1897 (MSC).

Lilium philadelphicum L.; Wood Lily; 30 Jun 1893 (MICH); 16 Jun 1899 (MSC); *H. M. Bailey* s.n., 4 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 23 Jun 1895 (MSC).

Lilium michiganense Farw. (*Lilium superbum* of Cole); Michigan Lily; 25 Jul 1893 (as *L. canadense*) (MICH); *H. M. Bailey* s.n., 9 Jul 1891 (MICH); *Mulliken* s.n., 26 Jun 1895, 4 Jul 1895 (MICH); *Skeels, Shaddick, B. E. Livingston & Fyfe* s.n., 21 Jul 1895, *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC); *Sones* s.n., 14 Jul 1889 (MICH).

MELIANTHACEAE (Bunchflower Family)

Aletris farinosa L.; Colic Root; *H. M. Bailey* s.n., 20 Jul 1892 (MICH); *M. B. Fallas* s.n., 10 Jul 1893 (MICH); *Mulliken* s.n., 24 Jun 1899 (MICH); *Mulliken* s.n., 24 Jun 1899 (MICH); *Sones* s.n., 2 July 1889 (MICH). Cole considered this species “rare.”

Anticlea elegans (Pursh) Rydb. (*Zigadenus elegans* of Cole and of Voss); White Camus; *B. E. Livingston* s.n., 19 Jul 1895 (MICH, WIS); *Skeels & Shaddick* s.n., 21 Jul 1895 (as *Zigadenus glaucus*) (MSC).

ORCHIDACEAE (Orchid Family)

Aplectrum hyemale (Willd.) Torr.; Putty-root, Adam-and-eve; 26 Aug 1896 (as *Corallorhiza maculata*) (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 18 May 1896 (MICH); *Skeels* s.n., 7 Aug 1896 (MICH, MSC); *Shaddick & Mrs. Hulst* s.n., 4 Jun 1897 (MSC).

Arethusa bulbosa L.; Arethusa, Dragon’s Mouth; *L. J. Cole* s.n., 22 May 1896 (MSC); *B. E. Livingston* s.n., 3 Jun 1891 (MICH), 11 Jun 1893 (WIS); *Mulliken* s.n., 22 May 1896 (MICH); *Skeels & Shaddick* s.n., 2 Jun 1893, 17 May 1896 (MSC). Cole noted that the species had been considered rather abundant at Orchid Swamp in the 1880s, but that Homer Skeels and Jennie Shaddick found only 7 plants there in 1898. This rich site has long been lost to expansion and development of the city of Grand Rapids.

Calopogon tuberosus (L.) Britton, Sterns & Poggenb. (*Calopogon pulchellus* of Cole); Grass-pink; *B. E. Livingston* s.n., 9 Jun 1891 (MICH); *Skeels & Shaddick* s.n., 27 Jun 1893, 16 Jun 1895 (as *C. pulchellus*) (MSC); *Sones* s.n., 30 Jun 1888 (MICH).

Coeloglossum viride (L.) Hartm. (*Habenaria bracteata* of Cole; *H. viridis* of Voss); Bracted Orchid; *H. M. Bailey* s.n., 12 May 1892, 6 Jul 1892 (MICH); *Shaddick & Mrs. Hulst* s.n., 22 May 1897 (MSC). Voss and Reznicek (2012) note that most collections from southern Michigan are quite old.

Corallorhiza maculata Nutt. (*Corallorhiza multiflora* of Cole); Spotted Coral-root; 31 Jul 1893 (as *C. innata*) (MICH); *H. M. Bailey* s.n., 11 Jul 1891 (MICH); *L. J. Cole* s.n., 11 Jul 1896 (MICH, MSC); *Skeels & Shaddick* s.n., 13 Aug 1893 (MSC), 18 Aug 1895 (MICH).

Corallorhiza trifida Châtel (*Corallorhiza innata* of Cole); Early Coral-root. No Cole vouchers located, but two collections by Bazuin from Kent County in 1942 exist (BHL, MICH).

Cypripedium acaule Aiton; Pink Lady-slipper, Moccasin Flower, Stemless Lady-slipper; Jun 1893 (ALBC); *H. M. Bailey* s.n., 23 May 1891 (MICH); *Skeels & Shaddick* s.n., 27 May 1893 (MSC). In correspondence with Emma Cole during the process of proof-reading her manuscript, Luther Livingston reminisced: “In 1885 my brother Lincoln B. L.[ivingston] found a specimen in Saddle Bag Swamp with a double lip, the lower flattened the upper inflated and resting upon the lower. One lip was not within the other. The next day I went out there and gathered a basketful, certainly 200 or 300 of the blossoms. They were all in a lit-

tle patch of tamaracks south of the R.R. track . . .” (unpublished notes written by Livingston to Emma Cole in June 1900, Gray Herbarium Archives).

Cypripedium candidum Willd.; White Lady-slipper; *Mulliken* s.n., 31 May 1897 (MICH, MSC); *Mulliken & Ford* s.n., 2 Jun 1895 (MICH); *Shaddick* s.n., 29 May 1895 (MICH, MSC); *Skeels & Shaddick* s.n., 20 Jun 1893 (MICH); *Skeels & Shaddick* s.n., 4 Jun 1893 (MSC). Luther Livingston’s notes to Emma Cole are revealing. “My memory is perfectly clear as to this. I could go to the exact fence corner and the exact bush (now gone or a tree) under which I found those plants. Only a day or two before I had first found them, and Oh? in what abundance in the low ground West of [deleted] Lake. There I had gathered a basketfull [sic].” (unpublished notes written by Livingston to Emma Cole in June 1900, Gray Herbarium Archives). **THREATENED.**

Cypripedium parviflorum Salisb. (including *Cypripedium pubescens* of Cole; *C. calceolus* of Voss); Yellow Lady-slipper; *H. M. Bailey* s.n., 30 May 1892 (as *C. pubescens*) (MICH); *L. J. Cole* s.n., 15 May 1895 (as *C. parviflorum*) (MSC); *Mulliken* s.n., 12 May 1896 (as *C. pubescens*) (MICH); *Shaddick, Fyfe, & Mulliken* s.n., 24 May 1896 (as *C. parviflorum*) (MSC); *Skeels* s.n., 1 Jun 1894 (as *C. parviflorum*) (MICH), 18 May 1895 (as *C. pubescens*) (MSC); *Sones* s.n., 12 May 1889 (as *C. pubescens*), 21 May 1889 (as *C. pubescens*) (MICH). Cole treated *C. parviflorum* and *C. pubescens* as separate species, whereas Voss and Reznicek (2012) treat two varieties of *C. parviflorum* for Michigan: the smaller-flowered var. *makasin* (*C. parviflorum* of Cole) and the larger-flowered var. *pubescens* (*C. pubescens* of Cole).

Cypripedium reginae Walter (*Cypripedium spectabile* of Cole); Showy Lady-slipper; *B. E. Livingston* s.n., 9 Jul 1891 (MICH); *Mulliken* s.n., 26 Jun 1895 (MICH); *Shaddick* s.n., 16 Jun 1895 (MSC); *Skeels & Shaddick* s.n., 24 Jun 1893 (MSC); *Skeels* s.n., 3 Aug 1893 (MSC).

Galearis spectabilis (L.) Raf. (*Orchis spectabilis* of Cole and of Voss); Showy Orchis; *H. M. Bailey* s.n., 30 May 1892; (MICH); *Lloyd Ford* s.n., 3 Jun 1892 (MICH); *Wise* s.n., 15 May 1893 (MICH). Cole cites four localities in the Grand Rapids area, none of which are extant, and says: “Rare in the State.” Voss and Reznicek (2012) say “recent collections very few.” **THREATENED.**

Goodyera pubescens (Willd.) R. Br.; Downy Rattlesnake-plantain; *Skeels & Shaddick* s.n., 3 Aug 1893, 19 May 1896, 18 Aug 1896 (MICH, MSC).

Isotria verticillata (Willd.) Raf.; Whorled Pogonia (*Pogonia verticillata* of Cole); *Norton* s.n., 6 Jun 1893 (MICH). Cole stated that “[t]his rare species was collected in a ravine in the north additions to John Ball Park, City, by Miss Lucy Norton” in 1893, but had never been rediscovered, even by Miss Norton; voucher in Ex. Herb. Mrs. Hattie M. Bailey [Pieters], now at MICH. **THREATENED.**

Liparis loeselii Richard; Green Twayblade, Fen Orchid, Loesel’s Twayblade; 10 Jul 1899 (MICH).

Malaxis unifolia Michx. (*Microstylis ophioglossoides* of Cole); Green Adder’s Mouth. Cole noted that “two plants were found at Saddle-Bag Swamp, Aug. 12, 1893 (O.H.) [by Shaddick and Skeel]; this station was destroyed in 1895.” No specimen at MSC; Voss and Reznicek (2012) do not report the species for Kent County.

Platanthera aquilonis Sheviak (*Habenaria hyperborea* of Cole and of Voss); Northern Green Orchid; *Skeels & Shaddick* s.n., 27 Jul 1895, *H. C. Skeels, Shaddick & D. A. Skeels* s.n., 18 Aug 1895 (both as *H. hyperborea*) (MSC).

Platanthera blephariglottis (Willd.) Lindl. (*Habenaria blephariglottis* of Cole and of Voss); White Fringed Orchid; 20 Jul 1898 (ALBC); 25 Jun 1893 (MICH); *F. P. Daniels* s.n., 31 Jul 1899 (MSC); *Skeels & Shaddick* s.n., 23 Jul 1893 (MSC). Cole noted that the species was destroyed in the main part of the Saddle-Bag Swamp region in 1895.

Platanthera ciliaris (L.) Lindl. (*Habenaria ciliaris* of Cole and of Voss); Orange Fringed Orchid, Yellow Fringed Orchid; 31 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 26 Jul 1893 (MSC); *Sones* s.n., s.d. (MICH). Cole considered this species nearly extirpated by 1901 in the Grand Rapids area. **ENDANGERED.**

Platanthera clavata (Michx.) Luer (*Habenaria tridentata* of Cole); Club-spur Orchid, Small Green Wood Orchid; *H. M. Bailey* s.n., 8 Aug 1893 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (as *H. tridentata*) (MSC).

- Platanthera dilatata* (Pursh) Lindl. (*Habenaria dilatata* of Cole and of Voss); Tall White Bog Orchid, Bog-candle; 8 May 1899; 30 Aug 1899 (MICH); *Skeels & Shaddick* s.n., 10 Jun 1893 (as *H. hyperborea*) (MSC).
- Platanthera flava* (L.) Lindl. (*Habenaria virescens* of Cole) Tubercled Orchid; *Mulliken* s.n., 22 Jun 1895 (MICH, MSC), 26 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 12 Jul 1894 (as *H. flava*) (MSC).
- Platanthera hookeri* (A. Gray) Lindl.; Hooker's Orchid (*Habenaria hookeriana* of Cole). Voss and Reznicek (2012) report no records for this species in Kent or Ottawa Counties. Although Cole cites five localities, no specimens of Cole or her colleagues with *Habenaria hookeriana* on the label have been found; this taxon should be excluded from the *Flora*.
- Platanthera lacera* (Michx.) G. Don (*Habenaria lacera* of Cole and of Voss); Ragged Fringed Orchid, Green-fringed Orchid; 6 Jul 1893 (MICH); *D. S. Bailey* s.n., 12 Jul 1892 (MICH). Cole notes that the station at Saddle-Bag Swamp was destroyed by fire in 1895.
- Platanthera leucophaea* (Nutt.) Lindl. (*Habenaria leucophaea* of Cole and of Voss); Prairie Fringed Orchid; Cole notes that the station at Saddle-Bag Swamp was destroyed in 1895; the other known site, Diamond Street Swamp, on the edge of the City (then Grand Rapids Twp.), has long since been filled in and is now residential housing. Although Cole sources Hattie M. Bailey Pieters for the locality, no specimen persists in that collection, which is now housed at MICH, hence this species is not shown for Kent County in Voss and Reznicek (2012). **ENDANGERED; FEDERALLY THREATENED.**
- Platanthera orbiculata* (Pursh) Lindl. (*Habenaria orbiculata* of Cole and of Voss) Round-leaved Orchid; *Skeels & Shaddick* s.n., 2 Jul 1893 (as *H. orbiculata*) (MSC). Cole noted that it was found in deep rich woods intermingled with pine; well distributed, but never abundant at any station. MICHIGAN FLORA ONLINE (2011) indicates that most specimens in the southern half of the Lower Peninsula are quite old.
- Platanthera psycodes* (L.) Lindl. (*Habenaria psycodes* of Cole and of Voss); Purple Fringed Orchid; 28 Jul 1893 (MICH); *H. M. Bailey* s.n., 11 Jul 1891 (MICH); *L. J. Cole* s.n., 18 Jul 1896 (MSC); *Mulliken* s.n., 22 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 1 Jul 1893 (MSC); *Sones* s.n., 30 Jun 1890 (MICH), 30 Jun 1890 (MO). Cole noted that although the occurrence was formerly frequent, it was already becoming only occasional by 1900; MICHIGAN FLORA ONLINE (2011) notes that it is rare now in southern Michigan.
- Pogonia ophioglossoides* (L.) Ker Gawl.; Rose Pogonia; 1 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 1 Jul 1893 (MSC).
- Spiranthes cernua* (L.) Rich.; Nodding Ladies'-tresses; 10 Sep 1892, 12 Aug 1896, 27 Aug 1896 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Mulliken* s.n., 9 Sep 1895 (MICH); *Skeels & Shaddick* s.n., 2 Sep 1892, 18 Aug 1895, 23 Aug 1896 (MSC).
- Spiranthes lacera* (Raf.) Raf.; Slender Ladies'-tresses (*Spiranthes gracilis* of Cole); *Matteson* s.n., s.d. (MICH).

POACEAE (Grass Family)

- Agrostis gigantea* Roth; Redtop (*Agrostis alba* of Cole); 5 Jul 1892 (MICH); *Mulliken* s.n., 6 Jul 1895, 24 Jun 1896 (MICH); *Sones* s.n., 15 Aug 1891 (MICH).
- Agrostis perennans* (Walter) Tuck.; Autumn Bent, Upland Bent; 4 Aug 1896 (as *A. scabra*), 5 Aug 1896, 29 Aug 1899 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC).
- Agrostis scabra* Willd.; Hairgrass (included in *Agrostis hyemalis* by Voss); 27 Jun 1893 (MICH).
- Agrostis stolonifera* L.; Creeping Bent; 9 Jul 1897 (as *Agrostis alba*) (MICH); *C. W. Fallass* s.n., 7 Jul 1897 (ALBC).
- Alopecurus aequalis* Solob. (*Alopecurus geniculatus aristulatus* of Cole); Short-awned Fox-tail; 19 Jul 1893, 19 Jul 1893 (MICH); *Mulliken* s.n., 19 Jun 1897 (MICH).
- Andropogon gerardii* Vitman (*Andropogon furcatus* of Cole; Big Bluestem, Turkey Foot; 10 Aug 1896 (as *A. furtacus* [sic]) (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH).
- Anthoxanthum hirtum* (Schrank) Y. Schouten & Veldkamp (*Hierochloë borealis* of Cole; *H. odoratus* of Voss); Sweet Grass; 19 May 1897 (MICH); *C. W. Fallass* s.n., 8 Jul 1897 (ALBC); *Sones* s.n., 15 May 1892 (MICH).
- Apera spica-venti* (L.) P. Beauv.; Loose Silky Bent, Apera; *M. B. Fallass* s.n., 1896 (ALBC).
- Avena sativa* L.; Oats; *H. M. Bailey* s.n., 2 Sep 1891 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC). This long-cultivated crop has appeared from time to time over the years as an

- “escape,” and Voss and Reznicek (2012) indicate that it was first collected in Michigan in 1895 in Kent County, presumably based on this specimen collected at Wallin’s Tannery along the west side of the Grand River in the City. It is notable that Cole did not include this species in *Grand Rapids Flora*.
- Bouteloua curtispindula*** (Michx.) Torr. (*Bouteloua racemosa* of Cole); Grama Grass, Sideoats Grama; 21 Jul 1876, 21 Jul 1896, 25 Aug 1898 (MICH). **ENDANGERED.**
- Brachyelytrum aristosum*** (Michx.) Branner & Coville (*Brachyelytrum erectum* of Cole; included in *B. erectum* of Voss); Northern Shorthusk; 10 Jul 1892 (MICH); Mulliken & E. J. Cole s.n., 12 Jun 1897 (MICH).
- Bromus hordeaceus*** L. (*Bromus mollis* of Cole and of Voss); Soft Chess, Soft Brome. Cole indicated that this plant occurred occasionally in waste places in the northern part of the City, but no specimen has been located, and Voss and Reznicek (2012) do not report the species for Kent County.
- Bromus briziformis*** Fisch. & C. A. Mey.; Rattlesnake-chess; 2 Jun 1893, 26 Jun 1893 (MICH); Mulliken s.n., 23 Jun 1896 (MICH); Skeels & Shaddick s.n., 28 Jul 1895 (MSC).
- Bromus ciliatus*** L.; Fringed Brome; 1 Jul 1892 (MICH).
- Bromus kalmii*** A. Gray; Prairie Brome; 28 Aug 1893, 10 Jul 1899, 11 Jul 1899 (MICH).
- Bromus nottowanus*** Fernald (included in *Bromus pubescens* of Voss); Satin Brome; 15 Jul 1888 (as *B. ciliatus purgans*) (MICH).
- Bromus pubescens*** Spreng. (*Bromus ciliatus purgans* of Cole); 26 Aug 1888, 31 May 1897, 29 Jun 1897, 26 Aug 1897 (MICH); 15 Jun 1893 (MSC).
- Bromus secalinus*** L. (*Bromus racemosus* of Cole); Cheat, Chess; 6 Jul 1878, 22 Jun 1899, 7 Jul 1899 (as *B. secalinus racemosus*) (MICH).
- Bromus tectorum*** L.; Downy Chess, Cheat Grass; 21 May 1894 (MSC), 20 Jun 1894 (MICH); Matteson s.n., 19 Jun 1894 (MSC); Mulliken s.n., 20 Jun 1896 (MICH); Shaddick s.n., 20 May 1896 (MSC). Cole credited C. W. Fallass with first discovering this species in 1894 in a vacant lot, thus representing the first report for Michigan (Voss and Reznicek 2012).
- Calamagrostis canadensis*** (Michx.) P. Beauv.; Blue-joint; 28 Jun 1893 (MICH); 28 Jun 1893 (MSC); H. M. Bailey s.n., 25 Aug 1893 (MICH); Sones s.n., 29 Aug 1891 (MICH).
- Cenchrus longispinus*** (Hack.) Fernald (*Cenchrus tribuloides* of Cole); Sandbur, Sandspur; 30 Jul 1898 (MICH); Skeels & Shaddick s.n., 14 Jul 1895 (MICH); Sones s.n., 26 Aug 1891 (MICH); Wheeler s.n., 1880 (MICH).
- Cinna arundinacea*** L.; Wood Reedgrass; 21 Oct 1892, Sep 1897 (MICH); M. B. Fallass s.n., 1898 (ALBC).
- Cinna latifolia*** (Goepp.) Griseb.; Wood Reedgrass; 8 July 1896 (as *Cinna pendula*) (MICH).
- Dactylis glomerata*** L.; Orchard Grass; 1 Jun 1894 (MICH); Mulliken s.n., 12 May 1895 (MICH).
- Danthonia spicata*** (L.) Roem. & Schult.; Poverty Grass, Oatgrass; 28 Jun 1893 (MICH); Mulliken s.n., 19 Jun 1897 (MICH).
- Deschampsia cespitosa*** (L.) P. Beauv.; Hair Grass; 21 Jun 1897, 21 Jun 1897, 2 Jun 1898 (MICH).
- Dichanthelium clandestinum*** (L.) Gould; Panic Grass; (*Panicum clandestinum* of Cole and of Voss); 9 Aug 1896, 14 Jul 1897 (MICH).
- Dichanthelium columbianum*** (Schribn.) Freckmann; Panic Grass; 15 Jun 1897 (as *Panicum nitidum*), 10 Jun 1899 (as *P. pubescens*), 20 Jun 1899 (as *P. dichotomum*) (MICH).
- Dichanthelium commutatum*** (Schult.) Gould; (*Panicum commutatum* of Cole); Panic Grass; Skeels & Shaddick s.n., 23 Aug 1896 (MSC).
- Dichanthelium depauperatum*** (Muhl.) Gould; Panic Grass; (*Panicum depauperatum* of Cole and of Voss); 20 Jun 1897 (ALBC); 15 Jun 1893, 10 Jun 1899, 23 Jun 1897, 14 Jun 1899 (MICH); 15 Jun 1893 (MSC).
- Dichanthelium dichotomum*** (L.) Gould; Panic Grass; (*Panicum dichotomum* of Cole and of Voss); 18 Jun 1890, 20 Jun 1897, 24 Jun 1898 (MICH); M. B. Fallass s.n., Sep 1894, 1898 (ALBC).
- Dichanthelium implicatum*** (Schrib.) Kerguelen (*Panicum implicatum* of Voss); Panic Grass; 16 Jun 1899 (as *Panicum boreale*), 22 Jun 1899, 23 Jun 1899 (both as *P. pubescens* (MICH); Sep 1894 (ALBC).

- Dichanthelium latifolium* (L.) Harvill (*Panicum latifolium* of Cole and of Voss); Broad-leaved Panic Grass; 10 Jun 1898 (MICH); *M. B. Fallass* s.n., Sep 1894 (ALBC), 25 Jun 1895 (MICH); *Mulliken* s.n., 12 Jul 1897 (MICH).
- Dichanthelium linearifolium* (Britton) Gould; Slender-leaved Panic Grass; Jul 1898, 10 Jun 1899 (both as *Panicum depauperatum*, 14 Jun 1899 (as *Panicum* sp.) (MICH).
- Dichanthelium meridionale* (Ashe) Freckmann; Mat Panic Grass; 8 Jul 1900 (as *Panicum pubescens*) (MICH).
- Dichanthelium oligosanthes* (Schlut.) Gould (*Panicum oligosanthes* of Voss); Panic Grass (3 Jun 1894, 20 Jun 1897, 21 Jun 1897, 14 Jun 1899 (as *Panicum scoparium*) (MICH); *M. B. Fallass* s.n., Jul 1896 (ALBC); *Mulliken* s.n., 22 May 1896 (MICH).
- Dichanthelium perlongum* (Nash) Freckmann (*Panicum perlongum* of Voss); Panic Grass; 23 Jun 1897, 10 Jun 1899 (as *P. depauperatum*) (MICH).
- Dichanthelium praecocius* (Hitchc. & Chase) Mohlenbr.; Panic Grass; 21 Jun 1897, 10 Jun 1899 (both as *Panicum pubescens*), 18 Jun 1899 (as *Panicum depauperatum*) (MICH); *Mulliken* s.n., 22 Jun 1895 (as *Panicum dichotomum*) (MICH).
- Dichanthelium sphaerocarpon* (Elliott) Gould (*Panicum sphaerocarpon* of Voss) Round-fruited Panic Grass; 20 Jun 1897, 12 Jul 1899 (MICH).
- Digitaria ischaemum* (Schreb.) Muhl.; Smooth Crab Grass (*Panicum glabrum* of Cole); *M. B. Fallass* s.n., Aug 1898 (ALBC); *Sones* s.n., 25 Aug 1891 (MICH).
- Digitaria sanguinalis* (L.) Scop. (*Panicum sanguinale* of Cole); Hairy Crab Grass; 19 Aug 1894 (MICH); *Sones* s.n., 1 Sep 1891 (MICH).
- Echinochloa crusgalli* (L.) P. Beauv. (*Panicum crus-galli* of Cole); Barnyard Grass; 20 Aug 1894 (MICH).
- Echinochloa muricata* (P. Beauv.) Fernald; Barnyard Grass; *M. B. Fallass* s.n., Aug 1894 (ALBC); *Skeels & Shaddick* s.n., 25 Aug 1896 (MSC); *Sones* s.n., 23 Aug 1891 (MICH).
- Echinochloa walteri* (Pursh) A. Heller (*Panicum crus-galli hispidum* of Cole); Salt-marsh Cockspur Grass; 26 Aug 1896 (MICH).
- Elymus canadensis* L. (including *Elymus canadensis glaucifolius* of Cole); Canada Wild Rye; 14 Jul 1896; 10 Jul 1896 (MSC).
- Elymus hystrix* L. (*Asprella hystrix* of Cole; *Hystrix patula* of Voss); Bottlebrush Grass; 20 Jun 1895 (MICH); 4 Jul 1895 (MICH).
- Elymus repens* (L.) Gould (*Agropyron repens* of Cole and of Voss) Quack Grass; 19 Jun 1897, 5 Jul 1897, Jul 1888 (MICH); *Sones* s.n., Jul 1891 (MICH).
- Elymus riparius* Wiegand; Riverbank Wild-rye; 2 Aug 1878, 25 Jul 1898 (both as *E. canadensis*) (MICH).
- Elymus trachycaulus* (Link) Gould (*Agropyron trachycaulus* of Voss); Slender Wheatgrass; 20 Jul 1893 (as *A. caninum*), 23 Jul 1898 (as *A. violaceum*) (MICH); *M. B. Fallass* s.n., Jul 1896 (MICH); *Mulliken* s.n., 18 Sep 1897 (MICH).
- Elymus villosus* Willd. (*Elymus striatus* of Cole); Silky Wild-rye; 23 Jul 1896 (as *E. striatus villosus*), 30 Jul 1898; 8 Jul 1899 (MICH); 20 Jun 1896 (MSC).
- Elymus virginicus* L.; Virginia Wild-rye; 12 Sep 1899 (MICH); *C. W. Fallass* s.n., 8 Jul 1897 (MICH).
- Eragrostis cilianensis* (All.) Janch. (*Eragrostis major* of Cole); Stink Grass; 31 Jul 1878 (MICH); *Skeels & Shaddick* s.n., 12 Jul 1895 (MSC); *Sones* s.n., 30 Aug 1891 (MICH).
- Eragrostis frankii* Steud.; Sandbar Love Grass; 28 Sep 1899 (ALBC); 26 Aug 1876, 5 Aug 1878 (MICH); 26 Aug 1876 (MSC); *Mulliken* s.n., 25 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC); *Sones* s.n., 6 Sep 1891 (MICH).
- Eragrostis hypnoides* (Lam.) Britton, Sterns & Poggenb. (*Eragrostis reptans* of Cole); Creeping Love Grass; 23 Aug 1893, 31 Aug 1899 (MICH); 23 Aug 1893 (MSC).
- Eragrostis pectinacea* (Michx.) Nees (including *Eragrostis frankii* and *E. purshii* of Cole) Love Grass; 22 Sep 1896 (as *E. purshii*), 1 Oct 1896 (as *E. pilosa*), 10 Sep 1897 (as *E. frankii*) (MICH); 4 Oct 1897 (as *E. purshii*) (MSC).
- Eragrostis spectabilis* (Pursh) Steud. (*Eragrostis pectinacea spectabilis* of Cole); Purple Love Grass, Tumble Grass; 21 Jul 1896 (MICH).
- Festuca octoflora* (Walter) Rydb. (*Festuca tenella* of Cole; *Vulpia octoflora* of Voss and Reznicek); Six-weeks Fescue; 30 May 1897 (MICH); *Mulliken* s.n., 31 May 1897 (MICH); *Wheeler* s.n., 22 May 1896 (MICH).

- Festuca rubra* L.; Red Fescue; 29 May 1899 (MICH).
- Festuca saximontana* Rydb. (*Festuca ovina* and *F. ovina pseudovina* of Cole); Fescue; 15 Jun 1893, 25 May 1897 (as *F. ovina pseudovina*), 15 Jun 1899 (MICH).
- Festuca subverticillata* (Pers.) E. B. Alexeev (*Festuca nutans* of Cole; *F. obtusa* of Voss); Nodding Fescue; May 1899 (ALBC); 20 Jun 1893, 20 Jun 1893, 15 Jul 1900 (MICH); *Mulliken* s.n., 23 May 1897 (MICH).
- Glyceria borealis* (Nash) Batch; Northern Manna Grass; *Mulliken* s.n., 19 Jun 1896 (as *G. fluitans*) (MICH).
- Glyceria canadensis* (Michx.) Trin.; Rattlesnake Grass; 20 Jul 1893, 1 Jul 1897, 1 Jul 1897 (MICH); 20 Jul 1893 (MSC).
- Glyceria grandis* S. Watson; Reed Manna Grass; 10 Jul 1896, 19 Jun 1897 (MICH); *Mulliken* s.n., 19 Jun 1897 (MICH).
- Glyceria septentrionalis* Hitchc. (*Glyceria fluitans* of Cole); Floating Manna Grass; 1 Sep 1893 (MICH).
- Glyceria striata* (Lam.) Hitchc. (*Glyceria nervata* of Cole); Fowl Manna Grass; 18 Jun 1893, 7 Jul 1893, 3 Jun 1898 (MICH); *Mulliken* s.n., 18 May 1896 (MICH).
- Grappophorum melicoides* (Michx.) Desv. (*Grappophorum melicoideum* [sic] of Cole; *Trisetum melicoides* of Voss); Trisetum; *R. E. Matteson* s.n., 12 Aug 1894, (MSC). **SPECIAL CONCERN.**
- Hesperostipa spartea* (Trin.) Barkworth (*Stipa spartea* of Cole and of Voss); Porcupine Grass; 18 Jun 1890, 18 Jun 1893, 12 Jun 1894 (MICH).
- Hordeum jubatum* L.; Squirrel-tail Grass; 20 Jun 1899 (MICH).
- Koeleria macrantha* (Ledeb.) Schult. (*Koeleria cristata* of Cole); June Grass; 28 Jun 1893 (MICH), 28 Jun 1893 (MSC); *M. B. Fallass* s.n., Jul 1896 (ALBC); *Mulliken* s.n., 12 Jun 1895 (MICH).
- Leersia oryzoides* (L.) Sw.; Cut Grass; 3 Sep 1894 (MICH); 1 Sep 1894 (MSC); *Sones* s.n., 12 Aug 1891 (MICH), 26 Aug 1891 (MSC).
- Leersia virginica* Willd.; White Grass; 9 Sep 1892 (MICH).
- Lolium perenne* L.; Ryegrass; 5 Sep 1898 (ALBC); 5 Sep 1898 (MICH).
- Milium effusum* L.; Wood Millet; 3 Jun 1893 (MICH); 3 Jun 1893 (MSC); *Mulliken* s.n., 16 May 1896 (MICH).
- Muhlenbergia frondosa* (Poir.) Fernald; Common Satin Grass; 4 Sep 1899 (as *Muhlenbergia sylvatica*) (MICH).
- Muhlenbergia glomerata* (Willd.) Trin.; Marsh Wild-Timothy; 25 Aug 1892 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH).
- Muhlenbergia mexicana* (L.) Trin.; Leafy Satin Grass; 12 Sep 1892. 25 Jul 1896 (MICH).
- Muhlenbergia schreberi* J. F. Gmel. (*Muhlenbergia diffusa* of Cole); Nimblewill; 26 Aug 1896 (MICH).
- Muhlenbergia sylvatica* (Torr.) A. Gray (including *M. willdenovii* of Cole); 1 Sep 1896, 12 Sep 1899 (MICH).
- Oryzopsis asperifolia* Michx.; Rough-leaved Rice-grass; 31 May 1894 (MICH); *Mulliken* s.n., 8 May 1897 (MICH); *Wheeler* s.n., 15 May 1895 (MICH).
- Panicum capillare* L.; Witch Grass; 20 Aug 1894 (MICH); s.n., 30 Aug 1891, 1 Sep 1891 (MICH); *Mulliken* s.n., 16 Sep 1897 (MICH).
- Panicum flexile* (Gatt.) Scribn.; Panic Grass; 20 Aug 1898, 5 Sep 1899, 5 Sep 1899 (MICH); *Mulliken* s.n., 25 Aug 1897 (ALBC), 23 Aug 1897 (MICH).
- Panicum miliaceum* L.; Broom Millet, Proso; *Skeels* s.n., 3 Aug 1895 (MICH, MSC), 3 Aug 1895 (MSC).
- Panicum virgatum* L.; Switch Grass; 23 Aug 1893, 25 Sep 1898 (MICH); 22 Aug 1893 (MSC); *Skeels & Shaddick* s.n., 25 Aug 1895, 26 Aug 1896 (MSC).
- Phalaris arundinacea* L.; Canary Reed Grass; 16 Jul 1893, 22 Jun 1897 (MICH).
- Phalaris canariensis* L.; Canary Grass; 5 Jul 1900 (MICH).
- Phleum pratense* L.; Timothy; *Sones* s.n., 9 Jul 1892 (MICH); *Mulliken* s.n., 6 Jul 1895 (MICH).
- Phragmites australis* subsp. *americanus* Saltonst., P. M. Peterson & Soreng; (*Phragmites communis* of Cole); American Reed; 5 Sep 1894 (MICH); *M. B. Fallass* s.n., 20 Aug 1898 (ALBC); *Skeels, Shaddick & Fyfe* s.n., 6 Oct 1895 (MSC); *Sones* s.n., 12 Sep 1885

- (MICH). This native taxon collected at Reed's Lake, then Grand Rapids Twp., and at Lambertson Lake, Grand Rapids Twp., is now treated by some botanists as a distinct species, *Phragmites americanus* (Saltonst., P. M. Peterson & Soreng) A. Haines (Haines 2011); the invasive Eurasian taxon that is rapidly displacing other wetland plants was not collected in Michigan until 1979, in shallow urban wetlands and along ditches and other disturbed wetlands (Voss and Reznicek 2012).
- Piptatheropsis pungens*** (Spreng.) Romasch., P. M. Peterson & Soreng; Rice-grass (*Oryzopsis canadensis* of Cole; *O. pungens* of Voss; *Piptatherum pungens* of Voss and Reznicek); 10 Jun 1899 (MICH); *Mulliken* s.n., 24 May 1891 (MICH).
- Patis racemosa*** (Sm.) Romasch., P. M. Peterson & Soreng (*Oryzopsis melanocarpa* of Cole; *Oryzopsis racemosa* of Voss; *Piptatherum racemosum* of Voss and Reznicek); Rice-grass; 20 Jun 1898 (MICH).
- Piptochaetium avenaceum*** (L.) Parodi (*Stipa avenacea* of Cole and of Voss); Black Oatgrass; 7 Jun 1893 (MICH); 7 Jun 1893 (MSC); *Shaddick & Fyfe* 14 Jun 1896 (MICH).
- Poa alsodes*** A. Gray; Bluegrass; 3 Jun 1893, 3 Jun 1893 (MICH); 3 Jun 1895 (MSC); *Wheeler* s.n., 16 May 1895 (MICH).
- Poa annua*** L.; Annual Bluegrass; Jul 1888 (MICH); 1 Jun 1895 (MSC); *Sones* s.n., 30 Aug 1891 (MICH).
- Poa compressa*** L.; Canada Bluegrass; 18 Jun 1893, 18 Jun 1893 (MICH); 18 Jun 1893 (MSC).
- Poa languida*** Hitchc. (*Poa debilis* of Cole); Bluegrass; 18 May 1899 (BLH); 8 Jul 1893, 20 Jul 1893, 25 May 1896 (MICH); 2 Jul 1893 (MSC); *Mulliken* s.n., 19 Jun 1897 (MICH).
- Poa paludigena*** Fernald & Wiegand; Bog Bluegrass; 8 Jun 1899 (as *Poa flexuosa*) (MICH).
THREATENED.
- Poa palustris*** L. (*Poa serotina* of Cole); Fowl Meadow Grass; 7 Jul 1893 (as *P. triflora*), 7 Jul 1893 (as *P. serotina*), 5 Jun 1896 (as *Glyceria* sp.), 6 Jul 1897 (as *P. serotina*) (MICH).
- Poa pratensis*** L.; Kentucky Bluegrass; 25 May 1878, 20 Jun 1897, 21 Jun 1897 (MICH); *Mulliken & L. J. Cole* s.n., 22 May 1896 (MICH).
- Poa sylvestris*** A. Gray; Woodland Bluegrass; 19 Jun 1897, 29 May 1898 (MICH).
- Schizachne purpurascens*** (Torr.) Swallen (*Avena striata* Michx. of Cole); False Melic; 29 May 1899, 3 Jun 1899, 10 Jun 1899 (MICH); *Mulliken* s.n., 7 May 1896, 7 May 1896 (MICH).
- Schizachyrium scoparium*** (Michx.) Nash (*Andropogon scoparius* of Cole); Little Bluestem; 10 Oct 1896 (MICH).
- Setaria italica*** (L.) P. Beauv.; Foxtail, Hungarian Millet; *M. B. Fallass* s.n., Oct 1898 (ALBC); *Sones* s.n., 13 Aug 1891 (MSC), 25 Aug 1891 (MICH). Cole noted that it has "escaped cultivation."
- Setaria pumila*** (Poir.) Roem. & Schult. (*Setaria glauca* of Cole and of Voss); Cole notes that it is common in waste places and cultivated fields, but no Cole specimen is extant).
- Setaria viridis*** (L.) P. Beauv.; Green Foxtail; 20 Aug 1892 (MICH); *Mulliken* s.n., 6 Jul 1895, 6 Jul 1895 (MICH); *Sones* s.n., 25 Aug 1891 (MICH).
- Sorghastrum nutans*** (L.) Nash (*Chrysopogon avenaceus* of Cole); Indian Grass; 10 Aug 1892 (MICH); 10 Aug 1892 (MSC).
- Spartina pectinata*** Link; Cordgrass (*Spartina cynosuroides* of Cole, a coastal plain species of the Southeast); *M. B. Fallass* s.n., 10 Jul 1874 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC); *Sones* s.n., 25 Aug 1891 (MICH).
- Sphenopholis intermedia*** (Rydb.) Rydb. (*Eatonia Pennsylvanica* of Cole); Slender Wedgegrass; 18 Jun 1894, 9 Jul 1896, 31 May 1899 (MICH).
- Sporobolus cryptandrus*** (Torr.) A. Gray; Sand Dropseed; 25 Aug 1896 (MICH).
- Sporobolus neglectus*** Nash; Small Rush Grass; 22 Sep 1899 (ALBC); 4 Oct 1899 (MICH).
- Sporobolus vaginiflorus*** (A. Gray) Alph. Wood. (*Sporobolus vaginaeflorus* [sic] of Cole); Sheathed Rush Grass; 22 Aug 1896, 6 Sep 1899, 7 Oct 1899 (as *S. neglectus*) (MICH).
- Torreyochloa pallida*** (Torr.) G. L. Church (*Glyceria pallida* of Cole; *Puccinellia pallida* of Voss); Pale False Mannagrass; 20 Aug 1892, 6 Sep 1893, 1 Jul 1897, 20 Jun 1899 (MICH); 1 Jul 1897 (MSC).
- Zizania palustris*** L. (*Zizania aquatica* of Cole; included in *Z. aquatica* of Voss); Northern Wild Rice, Wild Rice; *Skeels* s.n., 18 Aug 1895 (MICH).

PONTEDERIACEAE (Pickerel-weed Family)

- Heteranthera dubia* (Jacq.) MacMill. (*Heteranthera graminea* of Cole); Water Star-grass; 12 Jul 1896, 11 Jun 1899, 30 Sep 1899 (as *Potamogeton heterophyllus graminifolius*) (MICH); Mulliken s.n., 12 Jul 1895 (MICH); Skeels & Shaddick s.n., 19 Jul 1895 (MICH, MSC).
Pontederia cordata L.; Pickerel-weed; H. M. Bailey s.n., 28 Aug 1891 (MICH); Skeels & Shaddick s.n., 19 Jul 1895 (MSC); Sones s.n., 16 Aug 1891 (MICH).

POTAMOGETONACEAE (Pondweed Family)

- Potamogeton amplifolius* Tuck. (including *Potamogeton amplifolius*, *P. lucens* and *P. zizii* of Cole); Large-leaved Pondweed; 19 Jun 1896, 19 Jun 1896, 14 Jun 1897, 14 Jun 1897 (MICH).
Potamogeton foliosus Raf. (*Potamogeton foliosus niagarensis* (Tuck.) Morong of Cole); Leafy Pondweed; 5 Jul 1897 and 1 Aug 1897 (same sheet), 5 Jul 1897 and 1 Aug 1897 (same sheet), 16 Jul 1899, 16 Jul 1899, 20 Sep 1900 (MICH).
Potamogeton friesii Rupr.; Fries's Pondweed; 19 Jun 1896, 19 Jun 1896 (both as *P. mucronatus*) (MICH).
Potamogeton gramineus L. (*Potamogeton heterophyllus* and *P. heterophyllus graminifolius* (Fries) Morong of Cole); 30 Sep 1899, 12 Aug 1900, 12 Aug 1900 (MICH).
Potamogeton illinoensis Morong; Illinois Pondweed; 22 Jul 1896 and 22 Jul 1896 (as *P. illinoensis*), 19 Jul 1897 (2 sheets, as *P. lucens*), 9 Aug 1899 (as *P. lucens*), 2 Sep 1899 (as *P. zizii*), 8 Sep 1899 (as *P. illinoensis*), 23 Aug 1900 (2 sheets, as *P. lucens*) (MICH).
Potamogeton natans L.; Floating-Leaved Pondweed; 12 Aug 1896, 14 Jul 1897, 14 Jul 1897, 23 Aug 1900 (MICH).
Potamogeton nodosus Poir. (*Potamogeton lonchites* Tuck. of Cole); Pondweed; 12 Aug 1896 (as *P. natans*), 16 Jul 1899 (as *P. fluitans*), 2 Sep 1899 (as *P. fluitans*), 2 Sep 1899 (as *P. fluitans*) (MICH).
Potamogeton pusillus L. (*Potamogeton lateralis* Morong of Cole); Small Pondweed; 14 Jul 1897 (4 sheets, Reed's Lake, 2 as *P. lateralis*) (MICH). The name *Potamogeton lateralis* was based on a type specimen (GH) consisting of a mixed collection of *P. pusillus* and *P. vaseyi* (Crow and Hellquist 2000).
Potamogeton praelongus Wulf.; White-stemmed Pondweed, Muskie Weed; 24 Aug 1899, 24 Aug 1899, 29 Sep 1899, 29 Sep 1899 (MICH).
Potamogeton richardsonii (A. Benn.) Rydb. (*Potamogeton perfoliatus richardsonii* of Cole); Richardson's Pondweed; 19 Jun 1896 (2 sheets), 14 Jul 1897 (2 sheets), 24 Aug 1899 (2 sheets), all Reed's Lake (MICH); Skeels & Shaddick s.n., 14 Aug 1896 (MSC).
Potamogeton strictifolius A. Benn. Pondweed; Mulliken s.n., 20 Jun 1896 (MICH, MSC), 24 Jun 1896 (MICH).
Potamogeton zosteriformis Fernald (*Potamogeton zosteriaefolium* of Cole); Flat-stemmed Pondweed; Eel-grass Pondweed; 19 Jun 1896, 14 Jul 1897 (MICH); 18 Sep 1897 (MSC).
Stuckenia pectinata (L.) Börner (*Potamogeton pectinata* of Cole and of Voss); Sago Pondweed; 19 Jun 1896, Jul 1896, Jul 1896, 14 Jul 1897, 1 Aug 1897 (MICH); Mulliken s.n., 20 Jun 1896 (ALBC).

SCHEUCHZERIACEAE (Scheuchzeria or Pod-grass Family)

- Scheuchzeria palustris* L.; Pod-Grass; 28 Jun 1891 (ALBC); 10 May 1894, 6 Jul 1897 (MICH). Not rediscovered for Kent County since Cole's collections until our project encountered the species 23 Aug 2017, Quackenbush, Antuma, & Van Donselaar EC-17-2881 (CALVIN, MICH).

SMILACACEAE (Greenbrier, Catbrier, Carrion-flower Family)

- Smilax hispida* Raf.; Bristly Greenbrier; 1 June 1894 (MICH); Sones s.n., 16 Jun 1889 (MICH). Treated by Voss (1972) as *S. tamnoides*, but Voss and Reznicek (2012) follow Wilbur (2003) in treating *S. hispida* as a separate species and *S. tamnoides* as not applying to Michigan material.
Smilax illinoensis Mangly (*Smilax ecirrata* of Cole); Carrion-flower; 5 Jun 1897 (MICH); H. M. Bailey s.n., 11 Jun 1892, 15 Jun 1892 (MICH); L. J. Cole s.n., 15 May 1895 (MSC).
Smilax lasioneura Hook. (*Smilax herbacea* of Cole); Carrion-flower; H. M. Bailey s.n., 15 Jun 1892 (MICH).

Smilax rotundifolia L.; Common Greenbrier. Cole noted that it had not been found in the *Flora* area but was nearby in Blendon Twp., Ottawa Co., Cole s.n., 4 Sep 1896 (as *S. rotundifolia quadrangularis*) (MICH); there is as yet no record for Kent Co. (MICHIGAN FLORA ONLINE 2011).

TRILLIACEAE (Trillium Family)

Trillium cernuum L.; Nodding Trillium; May 1900 (MSC). Cole also cited Algoma Twp., Kent Co., woods on the southeast shore of Camp Lake just 3.5 miles north of the *Flora* area. This species had not been collected in Kent County since Cole's 1900 specimen, until we collected in Plainfield Twp. in 2015 as part of our current project to updated the flora of the Grand Rapids area; *Leisman, Van Staaldunin, & Crow EC-15-523* (CALVIN).

Trillium erectum L.; Stinking Benjamin, Red Trillium. Cole noted that it is "frequent," but no confirmed specimens persist. Two collections at MICH (*M. B. Fallass* s.n., 10 May 1897, *Raiquel 51303*, 24 May 1893) identified as *T. erectum* from Grand Rapids Twp., have since been annotated as *T. flexipes*.

Trillium flexipes Raf.; Drooping Trillium; *M. B. Fallass* s.n., 10 May 1897 (as *T. erectum*), 10 May 1898 (MICH).

Trillium grandiflorum (Michx.) Salisb.; Common Trillium, White Trillium; *H. M. Bailey* s.n., 26 Apr 1891, 30 May 1892 (MICH); *Mulliken* s.n., 11 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 12 May 1895 (MSC); *Sones* s.n., 30 Apr 1889 (MICH).

Trillium nivale Riddell; Dwarf White Trillium. Cole reported: "rare; north bank of Plaster Creek between the M. C. Ry. and G. R. & I. Ry. (Luther S. Livingston, 1882 to '86); Farm of Mr. Wilde, Sec. 20, Wright [Twp.] (Miss Mina Wilde). Miss Annah M. Clark reports this species as having been frequent about the City in the seventies." *Carl Smith* s.n., 1 May 1894 (MICH), a specimen from the Herbarium of Emma J. Cole, documents the species for Grand Rapids Twp.; four later collections at MICH document this rare plant from Kent County. **THREATENED.**

TYPHACEAE (Cat-tail Family)

Sparganium americanum Nutt.; American Bur-reed; Jul 1897 (as *S. eurycarpum*) (MICH).

Sparganium emersum Rehm. (*Sparganium chlorocarpum* of Voss); Green-Fruited Bur-reed; 3 Aug 1899 (as *S. simplex androcladum*) (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (MICH, MSC).

Sparganium eurycarpum Engelm. (including *Sparganium simplex* of Cole); Common Bur-reed; Jul 1897 (ALBC); 17 Jun 1899, 19 Jun 1899 (both as *S. simplex*) (MICH); *L. J. Cole* s.n. 8 Jun 1895 (MSC); *Mulliken* s.n., 8 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (MSC).

Typha latifolia L.; Common Cat-tail, Broad-leaved Cat-tail; 20 Jun 1895 (MICH); *Mulliken* s.n., 6 Aug 1895, 6 Aug 1897 (MICH); *Skeels* s.n., 31 Jan 1896 (MSC). Interestingly, *Typha angustifolia*, an adventive that is now widespread, was listed in Beal and Wheeler's (1892) *Michigan Flora* as "rare" (Detroit).

XYRIDACEAE (Yellow-eyed-grass Family)

Xyris torta Sm. (*X. flexuosa* of Cole); Yellow-eyed-grass; 1 Sep 1899 (MICH).

PRIMITIVE ANGIOSPERMS AND EUDICOTS

ADOXACEAE (Moschatel Family)

Sambucus canadensis L.; Common Elder, Elderberry; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 29 Jun 1891, 12 May 1892 (MICH); *Mulliken* s.n., 27 Jun 1896, 12 Jul 1897 (MICH).

Sambucus racemosa L.; Red-Berried Elder, Red Elderberry; 12 May 1893 (MICH); *Sones* s.n., 15 May 1889 (MICH).

Viburnum acerifolium L.; Maple-Leaved Viburnum; *Sones* s.n., 25 Jun 1890 (MICH).

Viburnum cassinoides L.; Wild-raisin, Withe-rod; 12 Aug 1896, 16 Jun 1897 (MICH); 16 Jun 1897 (MSC); *Mulliken* s.n., 19 Jun 1897 (MICH); *C. W. Fallass* s.n., 17 May 1894 (ALBC); *Skeels & Shaddick* s.n., 7 Aug 1896, 13 Sep 1896 (MSC).

Viburnum lentago L.; Nannyberry; 6 Jun 1893 (MICH); *Shaddick & Fyfe* s.n., 6 Jun 1896 (MSC).

Viburnum rafinesquianum Schult. (*Viburnum pubescens* of Cole); Downy Arrow-wood;

Shaddick & Fyfe s.n., 26 May 1896 (MSC); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC); *Mulliken* s.n., 22 May 1896 (MICH).

Viburnum trilobum Marshall (included in *Viburnum opulus* of Cole and of Voss); American Highbush-Cranberry; 26 May 1896 (MICH); *Mulliken & L. J. Cole* s.n., 22 May 1896 (MICH); *Skeels & Shaddick* s.n., 6 Aug 1896 (MSC); *Sones* s.n., 7 Jun 1889 (MICH). This North American native has often been treated as a variety of the European *V. opulus* sensu stricto, which was not documented as adventive in Michigan until 1926 (Voss and Reznicek 2012).

AMARANTHACEAE (Goosefoot or Pigweed Family)

Amaranthus albus L. (*Amaranthus graecizans* of Cole); Tumbleweed; 27 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC); *Sones* s.n., 16 Aug 1890 (MICH).

Amaranthus blitoides S. Watson; Amaranth; 12 Sep 1893 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Amaranthus hypochondriacus L. (*Amaranthus hybridus* of Cole); Amaranth; *Skeels, Shaddick & Fyfe* s.n., 6 Oct 1895 (as *A. hypochondriacus*) (MSC). Cole noted that this was “sparingly escaped” from gardens.

Amaranthus retroflexus L.; Rough Amaranthus; 31 Jul 1893 (MICH); *H. M. Bailey* s.n., 26 Aug 1892 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Amaranthus tuberculatus J. D. Sauer (*Acnida tamariscina* of Cole); Water-hemp; 6 Sep 1896 (as *Acnida cannabina*), 30 Aug 1899 (as *Acnida cannabina*), 31 Aug 1899 (as *Acnida tamariscina concatenata*), 8 Sep 1899 (as *Acnida tamariscina prostrata*) (MICH); 14 Jul 1896 (as *Acnida tuberculata*) (MSC); *M. B. Fallass* s.n., 22 Sep 1899 (ALBC); 20 Aug 1893 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (as *Acnida tuberculata*) (MSC). One Cole specimen is a sterile hybrid of *Amaranthus tuberculatus* × *A. retroflexus*; 6 Sep 1896 (as *Acnides cannabina*) (MICH).

Atriplex prostrata DC. (*Atriplex hastata* of Cole); Triangle Orache; *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH).

Chenopodium album L.; Lamb’s-quarters, Pigweed; 10 Jul 1893, 12 Aug 1896, 16 Sep 1899 (MICH); Sep 1899 (MSC); *Skeels* s.n., 12 Oct 1895 (MSC); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Chenopodium capitatum (L.) Ambros; Strawberry Blite; 10 Jul 1896 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895 (MICH, MSC).

Chenopodium glaucum L.; Oak-leaved Goosefoot; *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC), 25 Aug 1890 (MICH).

Chenopodium simplex Raf. (*Chenopodium hybridum* of Cole and of Voss); Maple-leaved Goosefoot; 10 Jul 1893 (MICH); *Mulliken* s.n., 27 Aug 1895 (MICH).

Chenopodium rubrum L.; Red Goosefoot; *Skeels & Fyfe* s.n., 13 Oct 1895 (MSC); *Skeels & Shaddick* s.n., 25 Aug 1895, 26 Aug 1896 (MSC).

Cycloloma atriplicifolium (Spreng.) J. M. Coult; Winged Pigweed (*Cycloloma platyphyllum* of Cole); 10 Aug 1896 (MICH); *Skeels* s.n., 26 Sep 1895 (MICH, MSC), 26 Sep 1895 (MSC). Cole noted that the plant was not established, but was found in a dumping ground in the City; Voss and Reznicek (2012) note that the first collection in Michigan was from Grand Rapids in 1895; it is well established today at one of Emma Cole’s sites, the Plain-field Plains, now a huge gravel operation, where some plants form large tumbleweeds.

Dysphania ambrosoides (L.) Mosyakin & Clemants (*Chenopodium ambrosoides* of Voss); Wormseed, Mexican-tea; 22 Sep 1902 (as *C. botrys*) (ALBC).

Dysphania botrys (L.) Mosyakin & Clemants (*Chenopodium botrys* of Cole and of Voss); Jerusalem-oak; 12 Sep 1893 (MICH); *M. B. Fallass* s.n., 3 Aug 1893 (MICH); *Mulliken* s.n., 20 Sep 1897 (MICH); *Skeels* s.n., 6 Aug 1895 (MSC); *Sones* s.n., 5 Sep 1891 (MICH).

Salsola tragus L. (*Salsola kali* of Voss); Russian-Thistle; 5 Oct 1894 (MICH); *L. J. Cole* s.n., 24 Sep 1895, 23 May 1896, s.d. 1896 (MSC); *Mulliken* s.n., Sep 1895, 24 Sep 1895 (MICH); *Mull[iken] & [L. J.] Cole* s.n., 23 May 1896 (MICH, MSC); *R. Matteson* s.n., 18 Jul 1896 (MSC); *Skeels* s.n., 26 Sep 1895 (MICH, MSC).

ANACARDIACEAE (Sumac Family)

Rhus copallina L.; Shining Sumac, Dwarf Sumac, Winged Sumac; 20 Jul 1893, 10 Aug 1893 (MICH).

Rhus glabra L.; Smooth Sumac; 7 Jul 1892 (MICH); *H. M. Bailey* s.n., 8 Jul 1892 (MICH); *Sones* s.n., 7 Jul 1889 (MICH).

Rhus typhina L.; Staghorn Sumac; 12 Jul 1896 (MICH); *H. M. Bailey* s.n., 6 Jun 1892 (MICH); *M. B. Fallass* s.n., Jun 1895 (MICH); *Mulliken* s.n., 12 Jul 1897 (MICH); *Sones* s.n., 2 Jul 1890 (MICH).

Toxicodendron radicans (L.) Kuntz; Poison Ivy (*Rhus toxicodendron* of Cole). Abundant in moist soil; not collected. Cole states: "Two forms of stems are common, one climbing by rootlets . . . the other low and trailing." No specimens were collected to document *T. radicans* for the *Flora* area. *Toxicodendron rydbergii* (Rydb.) Greene, a species that is always low and trailing, has been documented from adjacent Ottawa Co., but that specimen, collected by William T. Gillis in 1959, was collected from back dunes near Lake Michigan; there are no specimens confirming its presence in the *Flora* area.

Toxicodendron vernix (L.) Kuntze (*Rhus venenata* of Cole); Poison Sumac; Oct 1896, 20 Jun 1899 (MICH); *Shaddick & Fyfe* s.n., 7 Jun 1896 (MSC); *Sones* s.n., 10 Jul 1889 (MICH, MO). This species is abundant in the bog across from Cole's childhood home, a site she refers to as Miller's Lake. She was apparently prudent enough not to collect it there. However, in 2015, the new owners of two houses overlooking the bog both, unfortunately, got very bad cases of "poison ivy" from trying to remove tall shrubs to "improve their view" of the lake. I confirmed that the shrubs are *T. vernix*, but documented them only with photos.

ANNONACEAE (Custard-apple Family)

Asimina triloba (L.) Dunal; Pawpaw; 15 Jun 1893 (MICH); *Mulliken* s.n., 5 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 10 May 1895 (MSC); *Sones* s.n., 24 May 1889 (MICH).

APIACEAE (Carrot or Parsley Family)

Angelica atropurpurea L.; Purplestem Angelica; 18 Jun 1894 (MICH); *H. M. Bailey* s.n., 27 Jun 1892 (MICH).

Berula erecta (Huds.) Coville (*Berula angustifolia* of Cole); Water-Parsnip. Cole states that this species was "...found at Fallassburg [Kent Co., 3 miles east of her home] and may be looked for in this district. Infrequent in the State;" 12 Aug 1894, 28 Aug 1893 (MICH). **THREATENED.**

Carum carvi L.; Caraway; 10 Jun 1899 (MICH). Cole notes that it is "escaped from cultivation . . ." MICHIGAN FLORA ONLINE (2011) indicates that it was first collected in Michigan only six years earlier (in 1893 in Keweenaw Co.).

Chaerophyllum procumbens (L.) Crantz; Wild-Chervil; 20 May 1896, 13 May 1899 (MICH); *Mulliken* s.n., 2 May 1896 (MICH); *Mulliken & E. J. Cole* s.n., 2 May 1896 (MICH).

Cicuta bulbifera L.; Water-Hemlock; 6 Sep 1893, 12 Sep 1894 (MICH); *M. B. Fallass* s.n., Aug 1894 (ALBC), 12 Aug 1895 (MICH); *B. E. Livingston* s.n., 2 Aug 1895 (MICH).

Cicuta maculata L.; Spotted Cowbane; 28 Jul 1893 (MICH); *Mulliken & L. J. Cole* s.n., 27 Jun 1896 (MICH); *Sones* s.n., 8 Jul 1889 (MICH).

Conioselinum chinense (L.) Britton, Sterns, & Poggenb.; Hemlock-Parsley; 30 Sep 1899 (MICH); *Skeels & Rogers* s.n., 9 Sep 1895 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC). **SPECIAL CONCERN.**

Conium maculatum L.; Poison-hemlock; 25 Jul 1898 (MICH).

Cryptotaenia canadensis (L.) DC.; Honewort; 20 Jun 1895 (MICH); *H. M. Bailey* s.n., 29 Jun 1892 (MICH).

Daucus carota L.; Queen-Ann's-lace, Wild Carrot. No specimens are extant, but Cole notes that the plant is "becoming frequent," citing eight localities.

Erigenia bulbosa (Michx.) Nutt.; Harbinger-of-spring; Apr 1894 (ALBC); *H. M. Bailey* s.n., 2 May 1891, 14 Apr 1893 (MICH); *Mulliken* s.n., 14 Apr 1896 (MICH); *Sones* s.n., 20 Apr 1889 (MICH). Cole indicates that it is "common" in low woods, often appearing in late March with some snow still in shaded woods.

Foeniculum vulgare Mill.; Fennel; *Skeels* s.n., 2 Oct 1895 (as *F. officinale*) (MICH, MSC).

Heracleum maximum Bartram; Cow-parsnip (*Heracleum lanatum* of Cole); *H. M. Bailey* s.n., 13 Jun 1892 (MICH).

Osmorhiza claytonii (Michx.) C. B. Clark (*Osmorhiza brevistylis* of Cole); Hairy Sweet-ci-

- cely; *H. M. Bailey* s.n., 2 May 1891, 2 May 1892 (MICH); *Mulliken* s.n., 5 May 1892, 22 May 1897 (MICH); *Sones* s.n., 11 Jun 1889 (MICH).
- Osmorhiza longistylis*** (Torr.) DC.; Smooth Sweet-Cicely; 6 June 1894 (as *O. brevistylis*), 6 Jun 1894 (as *O. longistylis*) (MICH); *M. B. Fallass* s.n., Jun 1894 (ALBC).
- Oxypolis rigidior*** (L.) Raf. (*Tiedemannia rigida* of Cole); Cowbane; 20 Aug 1893, 6 Sep 1894, 3 Jul 1898 (as *Sium cicutaefolium*); with three additional specimens mounted on a sheet with *Sium suave* as *Tiedemannia rigida*: Aug 1899, 1 Sep 1899, 6 Sep 1899 (MICH); *Sones* s.n., 25 Aug 1891 (MICH).
- Pastinaca sativa*** L.; Wild Parsnip; 14 Jun 1899 (MICH); *H. M. Bailey* s.n., 24 Jun 1892 (MICH); *Sones* s.n., 9 Jul 1890 (MICH). MICHIGAN FLORA ONLINE (2011) says that this species was well established in Michigan by the 1880s, but was usually ignored.
- Sanicula marilandica*** L.; Black Snakeroot; 11 Jun 1898, 9 Jun 1900, 16 Jun 1900 (as *S. canadensis*), 16 Aug 1900 (MICH). *S. canadensis* L. is excluded from this updated checklist, since Cole's specimen of *S. canadensis* was annotated by Voss as *S. marilandica* and its distribution in MICHIGAN FLORA ONLINE (2011) does not include Kent County.
- Sanicula odorata*** (Raf.) Pryer & Phillippe (*Sanicula gregaria* of Cole and of Voss); 6 June 1893 (as *S. marilandica*), 9 Jun 1900 (MICH); *M. B. Fallass* s.n., Jun 1894 (ALBC); *Skeels & Shaddick* s.n., 19 Jul 1895 (as *S. marilandica*) (MICH); *Wheeler* s.n., 22 May 1896 (MICH).
- Sanicula trifoliata*** E. P. Bicknell; Black Snakeroot; *H. M. Bailey* s.n., 27 Jun 1892 (MICH).
- Sium suave*** Walter; Water-parsnip (*Sium cicutaefolium* of Cole); Aug 1899 (MICH); *Sones* s.n., 12 Aug 1891, 26 Aug 1891 (MICH).
- Taenidia integerrima*** (L.) Drude (*Pimpinella integerrima* of Cole); Yellow-Pimpernel; 25 Jun 1894 (MICH); *H. M. Bailey* s.n., 24 Jun 1892 (MICH); *Mulliken* s.n., 1 Jun 1895 (MICH).
- Zizia aptera*** (A. Gray) Fernald (*Zizia cordata* of Cole); Prairie Golden Alexanders; Jun 1887, 3 Aug 1897, 4 Aug 1897 (MICH); 3 Aug 1997 (MSC); all from "dry shaded bluffs, Thornapple River;" **THREATENED**.
- Zizia aurea*** (L.) W. D. J. Koch; Golden Alexanders; 1 Jun 1895, 22 May 1896 (MICH); *H. M. Bailey* s.n., Jun 1891 (MICH); *M. B. Fallass* s.n., Jun 1894 (ALBC); *Mulliken* s.n., 1895 (MICH); *Sones* s.n., 11 Jun 1889 (MICH).

APOCYNACEAE (Dogbane or Milkweed Family)

- Apocynum androsaemifolium*** L.; Spreading Dogbane; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 15 Aug 1891 (MICH); *Mulliken* s.n., 10 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 12 May 1895 (MSC).
- Apocynum cannabinum*** L. (including *Apocynum hypericifolium* of Cole); Indian-hemp; 25 Aug 1893, 1 Sep 1899, 1 Sep 1899, 8 Sep 1899 (MICH); *H. M. Bailey* s.n., 18 Jul 1892 (MICH); *Shaddick* s.n., 5 May 1896 (MSC); *Shaddick & Fyfe* s.n., 5 May 1896 (MSC); *Sones* s.n., 2 Jul 1889 (MICH).
- Asclepias amplexicaulis*** Sm. (*Asclepias obtusifolia* of Cole); Clasp Milkweed; 20 Jun 1893, 18 Jun 1896 (MICH, MSC); *H. M. Bailey* s.n., 28 Jun 1892 (MICH); *L. J. Cole* s.n., 24 Jun 1896 (MSC); *L. J. Cole & Mulliken* s.n., 23 Jun 1896 (MSC); *Mulliken* s.n., 18 Jun 1895, 27 Jun 1895 (MICH); *Shaddick & Fyfe* s.n., 7 Jun 1896 (MSU).
- Asclepias exaltata*** L. (*Asclepias phytolaccoides* of Cole); Poke Milkweed; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 7 Jul 1891 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MICH).
- Asclepias incarnata*** L.; Swamp Milkweed; 25 Jul 1893 (MICH); *H. M. Bailey* s.n., 26 Aug 1890, 12 Sep 1891 (MICH); *Mulliken* s.n., 6 Jul 1895 (MICH).
- Asclepias purpurascens*** L.; Purple Milkweed; 27 Jun 1893 (MICH); *H. M. Bailey* s.n., 30 Jun 1891 (MICH); *Sones* s.n., 2 Jul 1890 (MICH). Cole indicated that this species is "infrequent," but cites seven localities, including two within the City; **THREATENED**.
- Asclepias syriaca*** L.; Common Milkweed; 10 Jul 1893 (as *A. cornuti*) (MICH); *H. M. Bailey* s.n., 20 Aug 1891 (MICH).
- Asclepias tuberosa*** L.; Butterfly-weed; 6 Jul 1893 (MICH); *H. M. Bailey* s.n., 7 Jul 1891 (MICH); *Mulliken* s.n., 27 Jul 1897 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895 (MSC); *Sones* s.n., 14 Jul 1890 (MICH), 8 Jul 1893 (MSC).
- Asclepias verticillata*** L.; Whorled Milkweed; 18 Sep 1897 (MICH); *H. M. Bailey* s.n., 24

Aug 1892 (MICH); *L. J. Cole* s.n., 23 Jun 1896 (MSC; *Mulliken* s.n., 25 Jun 1896 (MICH); *Mulliken & E. J. Cole* s.n., 23 Jun 1896 (MICH); *Sones* s.n., 18 Jul 1890 (MICH).

Asclepias viridiflora Raf.; Green Milkweed; 24 Jul 1893, 4 Oct 1896 (MICH); *L. J. Cole* s.n., 24 Jun 1896 (MSC); *S. O. Livingston* s.n., 1896 (MSC); *Mulliken* s.n., 27 Jul 1895 (MICH); *Skeels* s.n., 26 Jul 1895 (MICH, MSC), 21 Aug 1896 (MSC).

Vinca minor L.; Periwinkle; no specimens document, but Cole notes it as “escaped near cemeteries and dwellings.”

AQUIFOLIACEAE (Holly Family)

Ilex verticillata (L.) A. Gray; Michigan Holly, Winterberry, Black-alder; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 18 Jul 1892 (MICH); *Mulliken* s.n., 27 Aug 1895 (MICH); *Sones* s.n., 25 Jun 1890 (MICH).

Ilex mucronata (L.) M. Powell, V. Savolainen, & A. Andrews (*Nemopanthus fascicularis* of Cole; *Nemopanthus mucronata* of Voss); Mountain Holly; 1 May 1893 (MICH).

ARALIACEAE (Ginseng Family)

Aralia hispida Vent.; Bristly Sarsaparilla; 25 Jun 1893, 28 Jun 1900 (MICH).

Aralia nudicaulis L.; Wild Sarsaparilla; *Mrs. H. B. Fallass* s.n., 18 Jun 1895 (MICH); *Wise* s.n., 29 May 1893 (MICH).

Aralia racemosa L.; Spikenard; 3 Aug 1896 and 4 Sep 1896 (flowering and fruiting, on same sheet) (MICH); *H. M. Bailey* s.n., 20 Jul 1893 (MICH); *M. B. Fallass* s.n., 2 Sep 1897 (MICH).

Aralia spinosa L.; Hercules-club; *B. E. Livingston* s.n., 19 Aug 1894 (MSC). This taxon was not included in Cole’s *Flora*, because the specimen cited (Herbarium of B. E. Livingston) apparently had not been seen by Cole; perhaps because, as an escape from cultivation in the City, Burton Livingston did not bring it to her attention. Voss and Reznicek (2012) cite this specimen as *Aralia elata*, representing the first documented record for that taxon in Michigan; but upon examination I’ve determined the specimen to be *A. spinosa*, as originally identified. The specimen still represents a first record for Michigan, but documenting *A. spinosa* instead.

Hydrocotyle americana L.; Water-pennywort; 25 Jul 1893 (MICH); *Skeels, Shaddick, Fyfe & B. E. Livingston* s.n., 21 Jul 1895 (MICH).

Hydrocotyle umbellata L.; Water-pennywort; 12 Aug 1896 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1896 (ALBC).

Panax quinquefolius L. (*Aralia quinquefolia* of Cole); Ginseng; 1 Sep 1896 (MICH). Cole notes: “Formerly common and well distributed. It has been nearly exterminated by digging the roots for profit.” **THREATENED.**

Panax trifolius L. (*Aralia trifolia* of Cole); Dwarf Ginseng; *H. M. Bailey* s.n., 7 May 1891 (MICH); *Mulliken & E. J. Cole* s.n., 2 May 1896; *Sones* s.n., 6 May 1889 (MICH).

ARISTOLOCHIACEAE (Birthwort Family)

Asarum canadense L.; Wild Ginger; 25 May 1893 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 15 May 1895 (MICH); *Shaddick, Fyfe, Mulliken & E. Cole* s.n., 23 May 1897, *Skeels & Shaddick* s.n., 23 May 1897 (MSC).

ASTERACEAE (Aster or Daisy Family)

Achillea millefolium L. (including *A. millefolium integrifolia* of Cole); Yarrow; 3 Jul 1893, 10 Aug 1893, 8 Jun 1899 (MICH); *H. M. Bailey* s.n., 24 Jul 1891, 21 Jul 1892 (MICH); *Mulliken* s.n., 10 Jun 1895 (MICH); *Skeels* s.n., 13 Sep 1895 (MICH).

Ageratina altissima (L.) R. M. King & H. Rob. (*Eupatorium ageratoides* of Cole; *E. rugosum* of Voss); White Snakeroot; 20 Aug 1893 (MICH); 11 Aug 1896 (MSC); *H. M. Bailey* s.n., 29 Aug 1891 (MICH).

Ambrosia artemisiifolia L.; Ragweed; 10 Aug 1893 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC); *Sones* s.n., 1 Sep 1891 (MICH).

Ambrosia trifida L.; Giant Ragweed; 28 Aug 1893, 25 Jul 1898 (MICH); *H. M. Bailey* s.n., 12 Sep 1892 (MICH); *L. J. Cole & Mulliken* s.n., 23 Aug 1895 (MICH); *Mulliken* s.n., 15 Aug 1897 (ALBC); *Skeels & Shaddick* s.n., 25 Aug 1895, 26 Aug 1896 (MSC); *Sones* s.n., 26 Aug 1891 (MICH).

Anaphalis margaritacea (L.) Benth. & Hook.; Pearly Everlasting; *Skeels & Shaddick* s.n., 2 Aug 1896, 2 Aug 1896 (MSC).

- Antennaria howellii*** Greene (*Antennaria neodioica* of Cole); Small Pussytoes; 24 May 1899 (as *A. farwellii*) (ALBC); 3 Jun 1900 (GH); 23 May 1899, 20 May 1899, 3 Jun 1900, 8 Jun 1900), 20 May 1898, 24 May 1899 and 10 June 1899 (on same sheet of *A. parlinii*) (MICH).
- Antennaria parlinii*** Fernald (including *Antennaria brainerdii*, *A. fallax*, *A. farwellii*, *A. parlinii*, *A. plantaginea* of Cole); Smooth Pussytoes; 19 May 1900, 27 May 1900, 9 Jun 1900 (GH); 5 May 1899, 22 May 1899, 23 May 1899, 23 May 1899, 24 May 1899, 29 May 1899, 29 May 1899, 4 Jun 1899, 5 May 1900, 11 May 1900, 19 May 1900, 23 May 1900, 3 Jun 1900, 8 Jun 1900, 9 Jun 1900 (MICH); 20 May 1899, 23 May 1899, 29 May 1899 (all 3 as *A. plantaginea*) (MSC); *H. M. Bailey* s.n., Jun 1892 (MICH); *L. J. Cole* s.n., 15 May 1895 (MICH, MSC); *Skeels* s.n., 12 May 1895 (MSC); *Skeels & Shaddick* s.n., 12 May 1895 (MSC).
- Anthemis arvensis*** L.; Corn Chamomile, Field Chamomile; 8 Jun 1900 (MICH).
- Anthemis cotula*** L.; Mayweed, Dog-fennel, Stinking Chamomile; 30 Jun 1893 (MICH); 30 Jun 1892 (MICH); *Mulliken* s.n., 25 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 26 Aug 1896 (MSC).
- Arctium minus*** Bernh. (*Arctium lappa minus* of Cole); Common Burdock; 31 Jul 1893, 1 Sep 1899, 1 Sep 1899 (MICH); *Skeels* s.n., 18 Aug 1895 (MSC); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC); *Skeels & Shaddick* s.n., 26 Aug 1896 (MICH, MSC). All these specimens were originally identified as *A. lappa*, but have since been annotated as *A. minus*.
- Arnoglossum atriplicifolium*** (L.) H. Rob. (*Senecio atriplicifolius* of Cole; *Cacalia atriplicifolia* of Voss); Pale Indian Plantain; 24 Jul 1893 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken & L. J. Cole* s.n., 2 Jul 1896 (MICH); *Skeels* s.n., 13 Nov 1895 (as *Cacalia atriplicifolia*) (MSC).
- Artemisia absinthium*** L.; Common Wormwood. No voucher; Cole states: "sparingly escaped from gardens."
- Artemisia biennis*** Willd.; Biennial Wormwood; 3 Oct 1893 (MICH); *Skeels* s.n., 13 Sep 1895 (MSC).
- Artemisia campestris*** L. (*Artemisia caudata* of Cole); Wild Wormwood; 24 Aug 1893 (MICH); *H. M. Bailey* s.n., 18 Aug 1893 (MICH); *Skeels* s.n., 13 Sep 1895 (MICH, MSC).
- Artemisia carruthii*** Carruth; Kansas Mugwort. Not included in Cole's *Flora*, since it was not collected until 1902 (MICHIGAN FLORA ONLINE 2011); *E. J. Cole* s.n., 1 Oct 1902 (MICH), 3 Oct 1902 (ALBC). Felt-boot factory refuse, Phillips farm (see Table 2).
- Bidens beckii*** Spreng. (*Megalodonta beckii* of Voss); Water-marigold; 25 Aug 1899 (MICH); *H. M. Bailey* s.n., 17 Jul 1891, 9 Aug 1894 (MICH); *Matteson* s.n., 19 Aug 1894 (MSC); *Skeels & Shaddick* s.n., 14 Aug 1896 (MSC).
- Bidens cernua*** L. (including *Bidens chrysanthemoides* of Cole); Nodding Beggar-ticks; 20 Aug 1893, 25 Aug 1893, 29 Aug 1893, 7 Sep 1894, 26 Aug 1899, 30 Aug 1899 (all as *B. chrysanthemoides*) (MICH); *Mulliken* s.n., 16 Aug 1895 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC).
- Bidens comosa*** (A. Gray) Wiegand (*Bidens connata comosa* of Cole); Swamp Tickseed; *M. B. Fallass* s.n., 28 Oct 1893 (ALBC).
- Bidens connata*** Muhl.; Purple-stemmed Tickseed; 30 Aug 1893, 1 Sep 1893, 27 Aug 1896 (MICH).
- Bidens discoidea*** (Torr. & A. Gray) Britton; Swamp Beggar-ticks; 12 Aug 1896, 10 Sep 1898 (as *Coreopsis discoidea*), 20 Aug 1898 (as *Coreopsis discoidea*), 12 Aug 1899, 30 Aug 1899 (MICH).
- Bidens trichosperma*** (Michx.) Britton (*Coreopsis trichosperma* of Cole; *Bidens coronata* of Voss); Tickseed-sunflower; 10 Sep 1894 (as *Coreopsis trichosperma tenuiloba*) (CU); 2 Sep 1893 (as *B. trichosperma tenuiloba*) (MICH); *H. M. Bailey* s.n., 28 Aug 1891 (MICH); *Mulliken* s.n., 10 Aug 1895, 23 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1896 (as *Coreopsis trichosperma tenuiloba*) (MSC).
- Bidens vulgata*** Greene (*Bidens frondosa* of Cole); Tall Beggar-ticks; 25 Aug 1893 (MICH).
- Brickellia eupatorioides*** (L.) Shinnars (*Kuhnia eupatorioides* of Cole and of Voss); False Boneset; 23 Sep 1893 (MICH); *M. B. Fallass* s.n., 20 Sep 1893 (MICH); *Mulliken* s.n., 9 Sep 1895, 9 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 13 Sep 1895, 5 Aug 1896 (MSC).
- SPECIAL CONCERN.**

- Centaurea virgata* Lam.; Turkish Knapweed; Jun 1900 (GH); 13 Jun 1900 (MICH). This species native to Turkey was not included in Cole's *Flora*, but MICHIGAN FLORA ONLINE (2011) indicates Cole's collection is the only record for Michigan; Felt-boot factory refuse, the Phillips farm (see Table 2).
- Cichorium intybus* L.; Chicory, Blue-sailors; Sones s.n., 3 Sep 1892 (MICH).
- Cirsium arvense* (L.) Scop. (*Cnicus arvensis* of Cole); Canada Thistle, Field Thistle; 18 Aug 1893 (MICH); Mulliken s.n., 28 Jul 1897 (MICH); Skeels & Shaddick s.n., 21 Aug 1896 (MSC); Sones s.n., 7 Jul 1890 (MICH).
- Cirsium discolor* (Willd.) Spreng. (*Cnicus altissimus discolor* of Cole); Pasture Thistle; 18 Aug 1893 (MICH); L. J. Cole s.n., 10 Aug 1895 (MSC); Mulliken s.n., 31 Aug 1897 (MICH); Skeels & Shaddick s.n., 25 Aug 1895 (MSC).
- Cirsium muticum* Michx. (*Cnicus muticus* of Cole); Swamp Thistle; 18 Aug 1893 (MICH); H. M. Bailey s.n., 11 Aug 1891 (MICH); Mulliken s.n., 4 Aug 1896 (MICH); Skeels & Shaddick s.n., 23 Aug 1896 (MSC).
- Cirsium vulgare* (Savi) Ten. (*Cnicus lanceolatus* of Cole); Bull Thistle; 20 Jul 1893 (MICH); Mulliken s.n., 24 Jul 1895 (MICH).
- Conyza canadensis* (L.) Cronquist (*Erigeron canadensis* of Cole); Horseweed; 7 Aug 1893 (MICH); Mulliken s.n., 31 Aug 1897 (MICH); Skeels & Shaddick s.n., 11 Aug 1896 (MSC); Sones s.n., 26 Aug 1891 (MICH).
- Coreopsis lanceolata* L.; Sand Coreopsis; 20 Jul 1898 (MICH).
- Coreopsis tripteris* L.; Tall Tickseed; Tall Coreopsis; 7 Aug 1893 (MICH); H. M. Bailey s.n., 17 Aug 1892 (MICH); L. S. Livingston s.n., 7 Aug 1895 (MICH); Skeels & Shaddick s.n., 6 Aug 1896 (CU); Skeels & Rogers s.n., 2 Sep 1895 (MSC).
- Crepis capillaris* (L.) Wallr.; Hawk's-Beard. No species of *Crepis* was included in *Grand Rapids Flora*; however, a Cole specimen, Jun 1897 (MICH), collected at Valley City Cemetery, Grand Rapids in 1897 was identified by Cole as *Crepis biennis* but later annotated as *C. capillaris*.
- Doellingeria umbellata* (Mill.) Nees (*Aster umbellatus* of Cole and of Voss); Flat-topped White Aster; 28 Aug 1893 (MICH); Mulliken s.n., 23 Aug 1897 (MICH).
- Dyssodia papposa* (Vent.) Hitchc.; Stinking-marigold; 25 Sep 1902 (as *Dyssodia chrysanthemoides*) (MICH). This species was not included in *Grand Rapids Flora*, but Cole's collection is significant as the first collection of this adventive plant in Michigan. The species was not collected in Michigan again until 2003 (MICHIGAN FLORA ONLINE 2011). Felt-boot factory refuse, Phillips farm (see Table 2).
- Echinacea purpurea* (L.) Moench; Purple Coneflower. Cole notes that the species is "[r]are" in the State" and that only a single plant was collected within her *Flora* area "in a field near Butterworth Ave. [in the City near John Ball Park], 16 Aug 1891, by Mrs. Delia Bailey Cobb." The specimen cited does not appear to be extant, although several other specimens of Delia Bailey are at MICH. **EXTIRPATED.**
- Echinops sphaerocephalus* L.; Globe Thistle; 2 Jul 1898 (MICH); 15 Oct 1900 (MSC); Skeels & Shaddick s.n., 16 Aug 1896 (MSC).
- Erechtites hieracifolius* (L.) DC. (*Erechtites praealta* of Cole); 23 Aug 1893 (MICH); M. B. Fallass s.n., s.d. (MICH); Skeels & Shaddick s.n., 11 Aug 1896 (MSC).
- Erigeron annuus* (L.) Pers.; Daisy Fleabane; 28 Jun 1893 (MICH); H. M. Bailey s.n., 29 Jun 1892 (MICH); Mulliken s.n., 12 Jul 1897 (MICH); Sones s.n., 22 May 1889.
- Erigeron flagellaris* A. Gray; Fleabane. The collection post-dates the publication of *Grand Rapids Flora*, but the specimen, E. J. Cole s.n., 10 Jun 1902 (MICH), is a significant record as the first and only collection of this western species in Michigan (Voss and Reznicek 2012). One of several species native to western N. Am. connected to Felt-boot factory refuse, Phillips farm (see Table 2).
- Erigeron philadelphicus* L.; Common Fleabane, Philadelphia Fleabane; H. M. Bailey s.n., 30 Jun 1891 (MICH); Mulliken s.n., 4 Jun 1895, 20 Jun 1895 (MICH).
- Erigeron pulchellus* Michx. (*Erigeron bellidifolius* of Cole) Robin's-plantain; L. J. Cole s.n. 15 May 1895 (MSC); M. B. Fallass s.n., May 1894 (ALBC); Mulliken s.n., 1 Jun 1895 (MICH); Skeels & Shaddick s.n., 19 Jun 1897 (MSC).
- Erigeron strigosus* Willd.; Daisy Fleabane; 30 Jun 1893 (MICH); H. M. Bailey s.n., 6 Jul 1892 (MICH); Mulliken s.n., 9 Sep 1895 (MICH).

- Eupatorium perfoliatum* L.; Boneset; 12 Aug 1893 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken* s.n., 4 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC); *Sones* s.n., 25 Aug 1891 (MICH).
- Eurybia macrophylla* (L.) Cass. (*Aster macrophyllus* of Cole and of Voss); Big-leaved Aster, Large-leaved Aster; 10 Aug 1893 (MICH); *H. M. Bailey* s.n., 8 Aug 1892 (MICH).
- Euthamia caroliniana* (L.) Porter & Britton (*Solidago tenuifolia* of Cole; *Euthamia remota* of Voss); Slender Goldentop; 12 Aug 1896, 3 Sep 1896 (MICH); *Hyser* s.n., 9 Sep 1899 (MICH).
- Euthamia graminifolia* (L.) Nutt. (*Solidago lanceolata* of Cole); Flat-topped Goldenrod, Grass-leaved Goldenrod, Bushy Goldenrod; 15 Sep 1893 (MICH); *Mulliken* s.n., 4 Sep 1897 (MICH).
- Eutrochium maculatum* (L.) E. E. Lamont (*Eupatorium purpureum* of Cole; *E. maculatum* of Voss); 12 Aug 1893 (MICH); *H. M. Bailey* s.n., 23 Aug 1891 (MICH); *Mulliken* s.n., 27 Jul 1895 (MICH); *Sones* s.n., 25 Aug 1891 (MICH).
- Gnaphalium uliginosum* L.; Low Cudweed; *Skeels* s.n., 28 Aug 1895 (MSC); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH).
- Grindelia squarrosa* (Pursh) Dunal; Gumweed; 13 Oct 1900, (MICH). Emma Cole's specimen is the first record for Michigan, introduced from Western N. Am.; Felt-boot factory refuse, Phillips farm (see Table 2).
- Helenium autumnale* L.; Sneezeweed; 23 Aug 1893 (MICH); *H. M. Bailey* s.n., 28 Aug 1891 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC); *Sones* s.n., 12 Aug 1895 (MICH).
- Helianthus annuus* L.; Sunflower; Sep 1902 (ALBC); *M. B. Fallass* s.n., s.d. (MICH); *Shaddick* s.n., 1 Sep 1895 (MSC); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC). A specimen from the C. W. Fallass collection at Albion College, *Cole* s.n., Sep 1902 (ALBC) identified as *H. petiolaris*, with a note on the sheet: "I think this is the Western *H. petiolaris* Nutt. which made its appearance in Gd Rapids on Bridge St. Hill in the early nineties. C.W. Fallas." This was later annotated as *H. annuus*.
- Helianthus decapetalus* L.; Thin-leaved Sunflower, Pale Sunflower; 31 Jul 1893, 20 Jul 1896 (MICH); *H. M. Bailey* s.n., 13 Aug 1891 (MICH).
- Helianthus divaricatus* L.; Woodland Sunflower; 27 Jul 1893 (MICH); *H. M. Bailey* s.n., 8 Aug 1892 (MICH); *Mulliken & L. J. Cole* s.n., 30 Jun 1896 (MICH); *Sones* s.n., 18 Jul 1890 (MICH).
- Helianthus giganteus* L.; Tall Sunflower; 12 Aug 1893 (MICH); *H. M. Bailey* s.n., 13 Aug 1891 (MICH); *Mulliken* s.n., 9 Sep 1895, 4 Sep 1897 (MICH); *Skeels* s.n., 13 Sep 1895 (MSC) (although this specimen has been annotated by R. W. Long, Jr. (1953) as *H. giganteus* × *H. grosserratus*, the plant does not have the characters of that entity).
- Helianthus occidentalis* Riddell; Western Sunflower; 3 Sep 1894 (CU); 7 Aug 1893, 27 Aug 1893 (MICH); *B. E. Livingston* s.n., 13 Aug 1892 (MSC); *Mulliken* s.n., 4 Aug 1896 (MICH); *Skeels & Shaddick* s.n., 7 Sep 1895 (MSC); *Sones* s.n., 25 Aug 1891 (MO).
- Helianthus petiolaris* Nutt.; Plains Sun flower, Prairie Sunflower; *C. W. Fallass* s.n., 8 Oct 1894, (ALBC). This specimen represented the first record for Michigan; collected on the Bridge Street Hill, Grand Rapids, it documented a western species that, according to the label, was "first observed by Miss Cole" and has "chaff at center of disk with long white cilia!" Cole also notes that the species also occurred on the Phillips farm, associated with Felt-boot factory refuse (see Table 2).
- Helianthus strumosus* L.; Pale-leaved Sunflower; 15 Aug 1893 (MICH); *M. B. Fallass* s.n., Sep 1890, 30 Sep 1894 (ALBC); *Sones* s.n., 6 Sep 1891 (MICH).
- Helianthus tuberosus* L.; Jerusalem-artichoke; *M. B. Fallass* s.n., 25 Aug 1894 (MICH). Cole stated: "Escaped from cultivation and becoming frequent."
- Heliopsis helianthoides* (L.) Sweet; False Sunflower; *H. M. Bailey* s.n., Sep 1892 (MICH). Not included by Cole in her *Flora*. Hattie Bailey's specimen, which Cole would have seen, was initially identified as *Helianthus strumosus*, but much later annotated as *Heliopsis helianthoides* (A. A. Reznicek pers. comm).
- Hieracium gronovii* L.; Hairy Hawkweed. There are numerous records for West Michigan, including Kent County, but Cole cites only a single specimen, collected by *Skeels & Shaddick* at John Ball Park (16 Aug 1896, MSC), which has been annotated as *H. scabrum*; see *H. scabrum*.

- Hieracium kalmii* L. (*Hieracium canadense* of Cole); Canada Hawkweed, Kalm's Hawkweed; 23 Jul 1893 (MICH); *H. M. Bailey* s.n., 18 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (as *H. canadense*) (MSC).
- Hieracium longipilum* Torr.; Prairie Hawkweed, Long-bearded Hawkweed; 6 Jul 1897, 14 Aug 1900 (MICH).
- Hieracium scabrum* Michx.; Rough Hawkweed; 23 Aug 1893 (MICH); *H. M. Bailey* s.n., 26 Aug 1892 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896, 16 Aug 1896 (both as *H. gronovii*) (MSC).
- Hieracium venosum* L.; Rattlesnake-weed, Veined Hawkweed; *H. M. Bailey* s.n., 18 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC).
- Inula helenium* L.; Elecampane; 21 Jul 1896 (MICH); *Skeels & Shaddick* s.n., 8 Aug 1895 (MICH, MSC).
- Krigia biflora* (Walter) S. F. Blake (*Krigia amplexicaulis* of Cole); False Dandelion; 9 Jun 1893 (MICH); *Mulliken* s.n., 11 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC).
- Krigia virginica* (L.) Willd.; Dwarf Dandelion; 25 May 1894 (MICH).
- Lactuca biennis* (Moench) Fernald (*Lactuca leucophaea* of Cole); Blue Lettuce; 3 Aug 1896 (MICH).
- Lactuca canadensis* L.; Wild Lettuce, Tall Lettuce; 7 Jul 1893 (MICH); *H. M. Bailey* s.n., 18 Jul 1892, 15 Jul 1893 (MICH); *C. W. Fallass* s.n., 20 Jul 1884 (ALBC); *Skeels, Shaddick, Fyfe & B. E. Livingston* s.n., 21 Jul 1895 (MSC).
- Lactuca hirsuta* Muhl.; Hairy Tall Lettuce; *H. M. Bailey* s.n., 12 Jul 1892 (MICH). Cole states: "Dry soil; scarce."
- Lactuca serriola* L. (*Lactuca scariola* of Cole); Prickly Lettuce; 8 Aug 1893 (MICH); *H. M. Bailey* s.n., 30 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895, 21 Aug 1896 (MSC); *Sones* s.n., 14 Aug 1889 (MICH).
- Leucanthemum vulgare* Lam.; Ox-Eye Daisy (*Chrysanthemum leucanthemum* of Cole and of Voss); *H. M. Bailey* s.n., 4 Jul 1892 (MICH); *Mulliken* s.n., 13 Jun 1895 (MICH). Cole notes, "It has been established at Reed's Lake for 30 years or more." It is so common today that most people think it is a native wildflower.
- Liatris aspera* Michx.; Rough Blazing-star; *H. M. Bailey* s.n., 24 Jul 1891 (MICH); *B. E. Livingston* s.n., 13 Aug 1894 (MSC); *Mulliken* s.n., 4 Aug 1896 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH, MSC); *Sones* s.n., 30 Jul 1892 (MO).
- Liatris cylindracea* Michx.; Cylindrical Blazing-star; 4 Aug 1893 (MICH); *H. M. Bailey* s.n., 17 Aug 1892 (MICH); *Mulliken* s.n., 3 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 2 Aug 1896 (MICH, MSC); *Sones* s.n., 5 Sep 1891 (MO).
- Liatris scariosa* (L.) Willd.; Northern Blazing-star; 18 Aug 1893 (MICH); *H. M. Bailey* s.n., 7 Aug 1892 (MICH).
- Liatris spicata* (L.) Willd.; Marsh Blazing-star; 4 Aug 1896 (MICH); *H. M. Bailey* s.n., 7 Aug 1893 (MICH); *Mulliken* s.n., 21 Jul 1895 (MICH); *Skeels* s.n., 28 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC).
- Onopordum acanthium* L. (*Onopordon* [sic] *acanthium* of Cole); Cotton Thistle, Scotch-thistle; 15 Jun 1896 (MICH); *L. J. Cole* s.n., 1 Jul 1896 (MSC); *Mulliken* s.n., 26 Jun 1896, 26 Jun 1896 (MICH); *Mulliken & L. J. Cole* s.n., 26 Jun 1896 (MSC); *Mulliken & Wurzburg* s.n., Jun 1896 (MICH).
- Packera aurea* (L.) Á. Löve & D. Löve (*Senecio aureus* of Cole and of Voss); Golden Ragwort; 17 May 1894, 2 Jun 1901 (MICH).
- Packera paupercula* Á. Löve & D. Löve (*Senecio aureus obovatus* of Cole; *S. plattensis* of Voss); Northern Ragwort, Balsam Ragwort; 12 Jun 1893 (GH); 12 Jun 1893 (MICH); *H. M. Bailey* s.n., s.d. (MICH).
- Polymnia canadensis* L.; Leaf-Cup; 22 Oct 1892, 26 Jun 1894 (MICH); *H. M. Bailey* s.n., 20 Aug 1894 (MICH); *Skeels* s.n. 19 Jul 1895 (MSC); *Skeels & Fyfe* s.n., 30 May 1896 (MSC).
- Prenanthes alba* L.; White Lettuce; 1 Sep 1893 (MICH); *H. M. Bailey* s.n., 29 Aug 1891 (MICH); *Mulliken* s.n., 18 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).
- Prenanthes altissima* L.; Tall White Lettuce; 1 Sep 1893, 4 Sep 1898 (MICH).

- Prenanthes racemosa* Michx.; Glaucous White Lettuce; 15 Sep 1893, 16 Sep 1893 (MICH); *H. M. Bailey* s.n., 9 Sep 1891 (MICH).
- Pseudognaphalium macounii* (Greene) Kartez (*Gnaphalium decurrens* of Cole; *G. macounii* of Voss); Clammy Cudweed; 23 Jul 1893 (MICH); *Mulliken* s.n., 13 Sep 1895 (MICH); *Skeels* s.n., 2 Sep 1895 (MSC); *Skeels* s.n., 13 Sep 1895 (MICH); *Skeels, Shaddick, & Fyfe* s.n., 6 Oct 1895 (MSC).
- Pseudognaphalium obtusifolium* (L.) Hilliard & B. L. Burt (*Gnaphalium obtusifolium* of Cole and of Voss); Fragrant Cudweed, Old-field Balsam; 23 Jul 1893 (as *Gnaphalium polycephalum*) (MICH); *H. M. Bailey* s.n., 7 Aug 1892 (MICH); *Mulliken* s.n., 7 Sep 1891 (MICH); *Skeels & Shaddick* s.n., 7 Sep 1895, *Skeels, Shaddick, & Fyfe* s.n., 6 Oct 1895 (MSC).
- Ratibida pinnata* (Vent.) Barnhart (*Lepachys pinnata* of Cole); Yellow Coneflower; 28 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC); *Sones* s.n., 18 Jul 1895 (MICH).
- Rudbeckia fulgida* Aiton; (*Rudbeckia speciosa* of Cole); Black-eyed Susan, Showy Coneflower, Orange Cone-flower; 15 Aug 1893 (MICH); *H. M. Bailey* s.n., 18 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (as *R. hirta*), 16 Aug 1896 (as *R. speciosa sullivantii*) (MSC).
- Rudbeckia hirta* L.; Black-eyed Susan; 28 Jun 1893 (MICH); *H. M. Bailey* s.n., 4 Jul 1892, 15 Jul 1892, 18 Jul 1892 (MICH); *Mulliken* s.n., 16 Jul 1895 (MICH).
- Rudbeckia laciniata* L.; Tall Coneflower, Cut-leaf Coneflower; 27 Jun 1893 (MICH); *H. M. Bailey* s.n., 13 Aug 1891 (MICH); *Mulliken* s.n., 26 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895 (MSC).
- Rudbeckia triloba* L.; Three-lobed Coneflower; *Mulliken, L. J. Cole & Pieters* s.n., 23 Aug 1897 (as *R. speciosa*) (MICH).
- Schkuhria multiflora* Hook & Arn.; Manyflower False Threadleaf. This was not included in the *Flora*, as it was a post-publication collection; 2 Sep 1902 (MICH). It is included here since it is a significant documentation of several adventives that showed up on the Phillips Farm as well as some odd Old World waifs (see Table 2). The species is not included in Voss and Reznicek (2012), perhaps because, as Voss (1996) states, the herbarium specimen consisted of just a fruiting piece of *Schkuhria multiflora*, along with the basal parts of a third plant, mounted on the same sheet as *Thelesperma megapotamicum*; apparently in his eyes this was hardly an adequate voucher for its presence in Michigan. It is suggested (MICHIGAN FLORA ONLINE 2011) that the occurrence of *S. multiflora* fragment may have been “an accidental post collection mix-up with the fragment.” However, in a letter from Emma Cole to M. L. Fernald she clearly refers to her two collections: “I take the liberty to send you two species of plants which were collected from a field on which Felt-boot factory refuse had been used as a fertilizer at least ten years ago. I am very much interested in collecting these plants from this dry sandy spot and have found fifteen species. It gives me an idea as to seeds which cling to the wool of sheep and can undergo the processes of the factory and grow here (Emma J. Cole, Feb. 21, 1903, unpublished letter in Gray Herbarium Archives).
- Silphium terebinthinaceum* Jacq.; Prairie-dock; 13 Sep 1896 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *B. E. Livingston* s.n., 25 Aug 1894 (MSC); *Mull[iken] & L. J. Cole* s.n., 2 Jul 1896 (MSC); *Skeels & Shaddick* s.n., 25 Aug 1896 (MSC); *Sones* s.n., 14 Jul 1889 (MICH).
- Smallanthus uvedalia* (L.) Mack. (*Polymnia uvedalia* of Cole and of Voss); Large-flowered Leafcup; 16 Aug 1897, 26 Aug 1897 (MICH); 26 Aug 1897 (MSC); *M. B. Fallass* s.n., 20 Sep 1897 (ALBC). **THREATENED.**
- Solidago bicolor* L.; White Goldenrod, Silver-rod; 4 Sep 1898 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC). In Cole’s time, it was known from only two other localities in Michigan; now it is known from only eight stations. **ENDANGERED.**
- Solidago caesia* L. (including *S. caesia axillaris* of Cole); Bluestem Goldenrod; 10 Oct 1896, 15 Sep 1899, 15 Sep 1899 (MICH).
- Solidago canadensis* L.; Canada Goldenrod; 20 Aug 1893 (MICH); *H. M. Bailey* s.n., 29 Aug 1891, 3 Aug 1893 (MICH); *M. B. Fallass* s.n., 20 Aug 1894 (ALBC); *Mulliken & L. J. Cole* s.n., 23 Aug 1897 (MICH).

- Solidago flexicaulis* L. (*Solidago latifolia* of Cole); Zigzag Goldenrod; 10 Sep 1893 (MICH); H. M. Bailey s.n., 29 Aug 1891 (MICH).
- Solidago gigantea* Aiton (*Solidago serotina* and *S. serotina gigantea* of Cole); Late Goldenrod; 25 Aug 1893 (as *S. serotina*) (MICH).
- Solidago hispida* Willd. (*Solidago bicolor concolor* of Cole); Hairy Goldenrod; 1 Sep 1893 (MICH); Hyser s.n., 30 Sep 1899 (MICH); Mulliken s.n., 18 Sep 1897 (MICH).
- Solidago juncea* Aiton; Early Goldenrod; 31 Jul 1893 (MICH); Mulliken & L. J. Cole s.n., 10 Aug 1895 (MICH).
- Solidago missouriensis* Nutt.; Missouri Goldenrod, Prairie Goldenrod; Mulliken s.n., 12 Aug 1897 (as *S. juncea*) (MICH); this taxon was not included in *Cole's Flora*, because it was not until 2011 that the specimen was annotated by J. A. Peirson as *S. missouriensis* (MICHIGAN FLORA ONLINE 2011). **THREATENED.**
- Solidago nemoralis* Aiton; Gray Goldenrod, Old-field Goldenrod; 25 Aug 1893 (MICH); Mulliken s.n., 18 Sep 1897 (MICH).
- Solidago ohioensis* Riddell; Ohio Goldenrod; 20 Sep 1892, 13 Sep 1893, 8 Sep 1899 (MICH); H. M. Bailey s.n., 25 Aug 1891 (MICH); Mulliken & L. J. Cole s.n., 23 Aug 1897 (MICH); Sones s.n., 25 Aug 1891 (MICH).
- Solidago patula* Willd.; Rough-leaved Goldenrod, Swamp Goldenrod; 31 Aug 1893, 10 Sep 1893 (MICH); Mulliken s.n., 4 Sep 1897 (MICH).
- Solidago riddellii* Frank; Riddell's Goldenrod; 28 Sep 1896, 10 Sep 1899 (MICH); B. E. Livingston s.n., 12 Aug 1894 (MICH); Mulliken s.n., 13 Sep 1897 (MICH).
- Solidago rigida* L.; Stiff Goldenrod; Oct 1893 (ALBC); 20 Aug 1893 (MICH); H. M. Bailey s.n., 25 Aug 1892 (MICH); Sones s.n., 25 Aug 1891 (MICH).
- Solidago rugosa* Mill.; Rough-leaved Goldenrod; Sep 1894 (ALBC); 2 Sep 1893 (MICH); Mulliken s.n., 13 Sep 1897 (MICH).
- Solidago speciosa* Nutt. (*Solidago rigidiuscula* of Cole); Showy Goldenrod; 20 Sep 1892 (as *S. speciosa*), 23 Jul 1893 (as *S. speciosa angustata*), 1 Aug 1893 (as *S. speciosa*) (MICH); 1 Aug 1893 (as *S. speciosa angustata*) (MSC); H. M. Bailey s.n., 23 Sep 1892, 5 Oct 1892, 3 Aug 1893 (MICH); Mulliken s.n., 27 Jul 1897 (MICH), 18 Sep 1897 (MSC); Skeels & Shaddick s.n., 28 Jul 1895 (MSC); Sones s.n., 1 Aug 1889, 1 Aug 1889 (MICH), 5 Sep 1891 (MO).
- Solidago uliginosa* Nutt. (including *Solidago neglecta* of Cole); Bog Goldenrod; 3 Sep 1876 (as *S. neglecta*), 31 Aug 1896 (as *S. neglecta*), 10 Aug 1899 (as *S. neglecta*), 5 Sep 1899 (as *S. uliginosa*) (MICH).
- Solidago ulmifolia* Willd.; Elm-leaved Goldenrod; 10 Sep 1893 (MICH); M. B. Fallas s.n., Sep 1898 (ALBC); 30 Sep 1897 (MICH).
- Sonchus asper* (L.) Hill.; Prickly Sow-thistle; 8 Jul 1893 (MICH); H. M. Bailey s.n., 9 Jul 1892 (MICH); Mulliken & L. J. Cole s.n., 23 Aug 1897 (MICH); Skeels s.n., 26 Aug 1896 (MSC).
- Sonchus oleraceus* L.; Common Sow-thistle; 20 Jul 1898 (MICH); Mulliken & L. J. Cole s.n., 29 Jun 1896 (MICH); Skeels s.n., 29 Aug 1895 (MICH), 17 Jul 1895 (MSC).
- Symphotrichum boreale* (Torr. & A. Gray) Á. Löve & D. Löve × *S. lanceolatum* (L.) G. L. Nesom; 18 Sep 1876 (as *Aster junceus*, annotated as hybrid by A. A. Reznicek) (MICH).
- Symphotrichum cordifolium* (L.) G. L. Nesom (*Aster cordifolius* of Cole and of Voss); Heart-leaved Aster, Blue Wood Aster; 27 Sep 1899 (as *Aster cordifolius polycephalus*) (MICH).
- Symphotrichum cordifolium* × *S. urophyllum*; 30 Sep 1899 (as *Aster cordifolius polycephalus*) (MICH).
- Symphotrichum drummondii* (Lindl.) G. L. Nesom (*Aster undulatus* of Cole; included in *Aster sagittifolius* of Voss); 3 Sep 1899, 30 Sep 1900 (MICH). Cole notes that, according to C. F. Wheeler, this is the first report for the species in Michigan. **THREATENED.**
- Symphotrichum dumosum* (L.) G. L. Nesom (*Aster ericoides* of Cole; *A. dumosus* of Voss); Bushy Aster; 1 Sep 1897 (as *Aster ericoides*), 16 Sep 1898 (as *A. ericoides*), 25 Sep 1898, 15 Oct 1898, 15 Oct 1898 (as *A. ericoides*) (MICH); Mulliken s.n., 23 Aug 1897 (as *A. tradescanti*) (MICH). One Cole specimen is annotated as *Symphotrichum dumosum* × *S. lateriflorum*; 30 Aug 1899 (as *Aster dumosus*) (MICH).
- Symphotrichum ericoides* (L.) G. L. Nesom (*Aster multiflorus* of Cole); Heath Aster, White

- Prairie Aster, Wreath Aster; 4 Oct 1897 (ALBC); 4 Oct. 1896, 25 Sep 1897; (MICH) *M. B. Fallass* s.n., Sep 1900 (ALBC).
- Symphotrichum firmum*** (Nees) G. L. Nesom (*Aster puniceus lucidulus* of Cole; *A. puniceus* of Voss); Smooth Swamp Aster; 5 Sep 1891 (MICH).
- Symphotrichum laeve*** (L.) G. L. Nesom (*Aster laevis* of Cole and of Voss); Smooth Aster; *H. M. Bailey* s.n., 29 Aug 1891 (MICH); *Mulliken* s.n., 9 Sep 1895, 4 Sep 1897 (MICH).
- Symphotrichum lanceolatum*** (L.) G. L. Nesom (*Aster paniculatus* of Cole; *A. lanceolatus* of Voss); Panicked Aster; 1 Sep 1892, 8 Sep 1893, 12 Aug 1896 (as *A. salicifolius*), 6 Sep 1898 (as *A. tradescanti*), 8 Oct 1898 (as *A. salicifolius*), 8 Oct 1898 (as *A. salicifolius*), 8 Sep 1899 (as *A. junceus*) (MICH).
- Symphotrichum lateriflorum*** (L.) Á. Löve & D. Löve (*Aster diffusus* of Cole; *Aster lateriflorus* of Voss); Calico Aster; 6 Sep 1896 (as *A. tradescanti*) (ALBC); 30 Sep 1893 (MICH).
- Symphotrichum novae-angliae*** (L.) G. L. Nesom (*Aster novae-angliae* of Cole and of Voss); New England Aster; 3 Sep 1893 (MICH); *H. M. Bailey* s.n., 26 Aug 1892 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH).
- Symphotrichum ontarionis*** (Wiegand) G. L. Nesom (*Aster paniculatus* and *A. tradescanti* of Cole; *A. ontarionis* of Voss); Lake Ontario Aster; 20 Aug 1893 (as *A. paniculatus*), 10 Sep 1893 (as *A. paniculatus*), 3 Sep 1896 (as *A. tradescanti*) 10 Sep 1898 (as *Aster vimineus*) (MICH); *M. B. Fallass* s.n., Sep 1893, Oct 1894 (ALBC); *Sones* s.n., 13 Aug 1891 (MICH).
- Symphotrichum oolentangiense*** (Riddell) G. L. Nesom (*Aster azureus* of Cole; *Aster oolentangiensis* of Voss); Sky-blue Aster, Prairie Heart-leaved Aster; 10 Oct 1896, 9 Sep 1899, 15 Sep 1899 (MICH); *Mulliken* s.n., 18 Sep 1897 (MICH).
- Symphotrichum puniceum*** (L.) Á. Löve & D. Löve (*Aster puniceus* of Cole); Swamp Aster, Purple-stemmed Aster; *Mulliken* s.n., 4 Sep 1897 (MICH).
- Symphotrichum sericeum*** (Vent.) G. L. Nesom (*Aster sericeus* of Cole and of Voss); Silky Aster, Western Silver-Leaved Aster; 25 Aug 1896 (BLH); 25 Aug 1896 (MICH).
THREATENED.
- Symphotrichum shortii*** (Lindl.) G. L. Nesom (*Aster shortii* of Cole and of Voss); Short's Aster; 15 Sep 1899 (MICH).
- Symphotrichum urophyllum*** (DC.) G. L. Nesom (*Aster sagittifolius* of Cole and of Voss); Arrow-leaved Aster; 1 Sep 1893, 14 Sep 1899 (as *A. cordifolius polycephalus*), 7 Oct 1899 (as *A. sagittifolius urophyllum*) (MICH); *Mulliken* s.n., 31 Aug 1897, 18 Sep 1897, 18 Sep 1897 (MICH); *Sones* s.n., 26 Aug 1891, 5 Sep 1891 (MICH).
- Tanacetum balsamita*** L.; Costmary, Mint-Geranium (*Chrysanthemum balsamita* of Cole and of Voss); 27 Oct 1897 (MICH); Cole notes: "escaped from gardens."
- Tanacetum vulgare*** L.; Common Tansy, Garden Tansy; 8 Aug 1893 (MICH); *H. M. Bailey* s.n., 3 Sep 1892 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC); *Sones* s.n., 15 Aug 1889 (MICH). Cole stated: "Escaped from cultivation; frequent near dwellings."
- Taraxacum officinale*** F. H. Wigg.; Common Dandelion; 12 May 1893 (MICH); *H. M. Bailey* s.n., 30 Jun 1892 (MICH); *Sones* s.n., 22 May 1889 (MICH). Cole notes that this species is "Distributed as a weed in all civilized parts of the world." Having found it abundant in disturbed sites on Isla Grande, Tierra del Fuego, Argentina in 1971 (Crow unpublished data), yet exceedingly sparse and rare (3 collections) on the adjacent uninhabited Isla de los Estados, I concur (Dudley and Crow 1983).
- Thelesperma megapotamicum*** (Spreng.) Kuntze; Thelesperma. This taxon was not included in the *Flora*, as it was a post-publication collection; 2 Sep 1902 (as *T. scabiosoides*) (MICH). This is another unusual waif from western U. S. found on the Phillips farm, associated with Felt-boot factory refuse (see Table 2). Cole's specimen is the only record for Michigan (MICHIGAN FLORA ONLINE 2011).
- Tragopogon porrifolius*** L.; Salsify, Vegetable-oyster; Jun 1897 (MICH).
- Tragopogon pratensis*** L.; Common Goat's Beard; Jun 1894 (MICH); *H. M. Bailey* s.n., 3 Jun 1892 (MICH); *Sones* s.n., 3 Jun 1889 (MICH).
- Verbesina encelioides*** (Cav.) A. Gray; Golden Crownbeard; *Phillips* s.n., Sep 1895 (ALBC); 9 Sep 1895 (MICH). The only report for Michigan, Cole notes that this annual was first noticed in 1892, documented in 1895 by Allen Phillips, with note on specimen at ALBC:

“Brought from the West in wool for the felt boot factory, and spread through the waste from the factory being used as a fertilizer” (see Table 2).

Vernonia missurica Raf.; Ironweed; 20 Aug 1893 (as *V. altissima altissima grandiflora*), 4 Sep 1899 (as *V. altissima*), 10 Sep 1899 (as *V. glauca*) (MICH); *H. M. Bailey* s.n., 28 Aug 1891, 8 Aug 1892 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC).

Xanthium strumarium L.; Cocklebur; 15 Aug 1893, 28 Aug 1893 (both as *X. canadense*) (MICH) *M. B. Fallass* s.n., 1899 (ALBC).

BALSAMINACEAE (Touch-me-not Family)

Impatiens capensis Meerb. (*Impatiens biflora* of Cole); Spotted Touch-me-not; 9 Aug 1893 (as *I. fulva*) (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken* s.n., 22 Jun 1895 (MICH).

Impatiens pallida Nutt. (*Impatiens aurea* of Cole); Pale Touch-me-not; 11 Jul 1896 (MICH); *H. M. Bailey* s.n., 8 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 13 Sep 1896 (MSC); *Sones* s.n., 13 Jul 1890 (MICH).

BERBERIDACEAE (Barberry Family)

Berberis vulgaris L.; Common Barberry; 1893 (ALBC); Sep 1896 (MICH). Cole notes that this European shrub was occasionally encountered near old gardens; MICHIGAN FLORA ONLINE (2011) indicates that the species has largely been eradicated because it served as an alternate host for wheat rust, a destructive fungal disease. The Asian ornamental *Berberis thunbergii* (Japanese Barberry) was not documented as adventive in Michigan until 1909, but, readily spread by birds, is now fairly common.

Caulophyllum thalictroides (L.) Michx.; Blue Cohosh; 12 May 1893 (MICH); 7 May 1892 (MICH).

Jeffersonia diphylla (L.) Pers.; Twinflower; 15 Apr 1893 (MICH); *Skeels* s.n., 8 May 1893 (MICH). **SPECIAL CONCERN.**

Podophyllum peltatum L.; May-apple, Mandrake; 1 Jun 1893 (MICH); *Mulliken* s.n., 22 May 1897 (MICH); *Sones* s.n., 24 May 1889 (MICH).

BETULACEAE (Birch Family)

Alnus incana (L.) Moench; Speckled Alder; *H. M. Bailey* s.n., 7 Apr 1892 (MICH); *Mulliken* s.n., 7 Apr 1896; *Skeels* s.n., 20 Sep 1895 (MICH).

Betula alleghaniensis Britton (*Betula lutea* and *B. lenta* of Cole; *B. lutea* of Voss); Yellow Birch; 17 May 1894, 25 May 1894, 22 May 1896, 25 Aug 1899 (all 4 as *B. lenta*) (MICH); *Skeels* s.n., 21 Aug 1896 (MICH).

Betula papyrifera Marshall; Paper Birch, White Birch, Canoe Birch; Jun 1897 (MICH).

Betula pumila L.; Bog Birch, Dwarf Birch; 3 Jun 1894 (MICH); *Skeels* s.n., 13 Jul 1895 (MICH).

Carpinus caroliniana Walter; Hornbeam, Blue-Beech, Ironwood; 20 May 1894 (MICH); 12 May 1892 (MICH).

Corylus americana Walter; Hazelnut; 1 Apr 1897 (MICH); *H. M. Bailey* s.n., 11 Jul 1892 (MICH); *Mulliken* s.n., 14 Apr 1896, 13 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 12 Apr 1896 (MSC).

Ostrya virginiana (Mill.) K. Koch; Hop-hornbeam, Ironwood; 23 Apr 1897 (MICH); *Mulliken* s.n., 10 Aug 1895, 2 May 1896, 11 Aug 1896, 8 May 1897 (MICH); *Skeels & B. E. Livingston* s.n., 22 Dec 1895 (MSC).

BORAGINACEAE (Borage Family)

Buglossoides arvensis (L.) I. M. Johnst. (*Lithospermum arvense* of Cole and of Voss); Corn Gromwell; 1 May 1894 (MICH); *H. M. Bailey* s.n., 22 May 1892 (MICH); *Mulliken* s.n., 2 May 1896 (MICH); *Skeels & Shaddick* s.n., 19 May 1895, 19 May 1895 (MSC).

Cynoglossum officinale L.; Hound's-tongue; 8 Jun 1893 (MICH); *Mulliken* s.n., 1 Jun 1895 (MICH); *Sones* s.n., 4 Jun 1889 (MICH).

Echium vulgare L.; Blueweed, Viper's Bugloss; 19 Jun 1897 (MICH).

Hackelia virginiana (L.) I. M. Johnst. (*Echinopspermum virginicum* of Cole); Beggar's Lice; 19 Jul 1893, 10 Jul 1896 (MICH); 27 Aug 1895, 1 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 26 Aug 1896 (MSC); *Sones* s.n., Jul 1891 (MICH).

- Hydrophyllum appendiculatum* Michx.; Great Waterleaf; 6 Jun 1893 (MICH); *H. M. Bailey* s.n., 9 Jun 1892 (MICH); *C. W. Fallass* s.n., 26 May 1894 (ALBC).
- Hydrophyllum canadense* L.; Broadleaved Waterleaf, Canada Waterleaf; 1 Aug 1896, 19 Jun 1897 (MICH); *H. M. Bailey* s.n., 8 Jul 1892 (MICH); *M. B. Fallass* s.n., 18 Aug 1899 (ALBC); *Mulliken* s.n., 19 Jun 1897 (MICH).
- Hydrophyllum virginianum* L.; Virginia Waterleaf; 20 Jun 1894 (MICH).
- Lappula squarrosa* (Retz.) Dumort. (*Echinosperrum lappula* of Cole); European Stickseed; 31 Jul 1893 (MICH); *H. M. Bailey* s.n., 30 Jun 1892 (MICH); *Mulliken* s.n., 24 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC); *Shaddick* s.n., 14 Jun 1896 (MSC).
- Lithospermum canescens* (Michx.) Lehm.; Hoary Puccoon; 10 May 1893 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Skeels & Shaddick* s.n., 12 May 1895 (MSC).
- Lithospermum caroliniense* (Walter) MacMill. (*Lithospermum hirtum* of Cole); Hairy Puccoon, Yellow Puccoon, Plains Puccoon; 30 May 1893 (MICH); *H. M. Bailey* s.n., 12 Jul 1892 (MICH); *Mulliken* s.n., 2 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895, 28 Jul 1895, 16 Aug 1896 (MSC); *Sones* s.n., 13 Jun 1889 (MICH).
- Lithospermum latifolium* Michx.; American Gromwell, Broadleaved Puccoon; 14 Jul 1896 (MICH). **SPECIAL CONCERN.**
- Mertensia virginica* (L.) Pers.; Virginia Bluebells, Virginia Cowslip; *H. M. Bailey* s.n., 10 May 1891 (MICH); *L. J. Cole* s.n., 9 May 1896 (MSU); *C. W. Fallass* s.n., 15 May 1895 (ALBC); *Matteson* s.n., 7 May 1894 (MICH, MSC); *Mulliken* s.n., 10 May 1893 (MICH); *Sones* s.n., 7 May 1889 (MICH); *Wise* s.n., 10 May 1893. Cole cites R. E. Matteson as reporting the occurrence of the plant as “scattered along Plaster Creek from Kalamazoo Ave. to the Grand River.” **ENDANGERED.**
- Myosotis scorpioides* L.; Forget-me-not. No specimen documents this species, but Cole includes this garden plant, crediting an observation of an escapee by R. E. Matteson from within the City. The species is now naturalized widely in Michigan.
- Myosotis stricta* Link; Forget-me-not; *C. W. Fallass* s.n., 1894 (ALBC, MSC). It’s surprising that Cole did not include this species in her flora; MICHIGAN FLORA ONLINE (2011) indicates that this Fallass specimen from Grand Rapids Twp. is the first collection for Michigan.
- Symphytum officinale* L.; Common Comfrey; 19 Jun 1895 (MICH); an escape from gardens.

BRASSICACEAE (Mustard Family)

- Alyssum alyssoides* (L.) L. (*Alyssum calycinum* of Cole); Pale Alyssum; 20 Jun 1894 (MICH).
- Arabidopsis lyrata* (L.) O’Kane & Al-Shehbaz (*Arabis lyrata* of Cole and of Voss); Sand Cress; 12 May 1893 (MICH); 4 Jul 1892 (MICH); *Mulliken* s.n., 14 May 1897 (MICH); *Skeels & Shaddick* s.n., 12 May 1895 (MSC); *Skeels, Shaddick & Fyfe* s.n., 6 Oct 1895 (MSC); *Skeels* s.n., 8 May 1895, 8 May 1895 (MSC).
- Arabis pycnocarpa* M. Hopkins (*Arabis hirsuta* of Cole and of Voss); Hairy Rock Cress; 24 Jun 1897 (MICH); *Mulliken & Fyfe* s.n., 24 May 1896 (MSC); *Skeels, Shaddick & Fyfe* s.n., 28 Jul 1895 (MICH).
- Armoracia rusticana* G. Gaertn., B. Mey. & Scherb. (*Nasturtium armoracia* of Cole); Horseradish; 20 Jun 1895 (MICH).
- Barbarea verna* (Mill.) Asch. (*Barbarea stricta* of Cole); Winter Cress; 24 May 1900 (MICH). Cole notes that this species first appeared in a vineyard in Alpine Twp. (Sec. 8) in 1899 and 1900; her collection is the first record for Michigan (Voss and Reznicek 2012).
- Barbarea vulgaris* W. T. Aiton; Winter Cress; 10 May 1894 (MICH). Cole noted, “becoming frequent” in wet areas; today it is one of our most common weeds.
- Boechera canadensis* (L.) Al-Shehbaz (*Arabis canadensis* of Cole and of Voss); Sickie-pod; 18 Jun 1893 (MICH); *H. M. Bailey* s.n., 10 Jul 1893 (MICH); *M. B. Fallass* s.n., Jun 1894 (ALBC); *Mulliken* s.n., 4 Aug 1896 (MICH); *Shaddick* s.n., 18 Jun 1896 (MSC); *Shaddick & Fyfe* s.n., 30 May 1896 (MSC); *Skeels* s.n., 20 Sep 1895 (MSC).
- Boechera dentata* (Raf.) Al-Shehbaz & Zarucchi; (*Arabis dentata* of Cole; *Arabis perstellata* of Voss); Rock Cress; 5 Jun 1897 (ALBC); *Wheeler* s.n. 16 May 1895, 19 May 1895 (MICH, MSC). Cole included this species based on C. F. Wheeler collections from the “[b]ank of Grand River at the Soldier’s Home” and on S. E. Knappen’s noting of it growing along the Grand River at Indian Mounds; Cole’s specimen merely says Grand Rapids,

- presumably meaning Grand Rapids Twp., and probably along the Grand River. **THREATENED.**
- Boechera grahamii* (Lehm.) Windham & Al-Shehbaz; (*Arabis confinis* of Cole; *A. divaricarpa* of Voss) Rock Cress. Cole's inclusion of this species appears to be an error; her only extant collection (MICHIGAN FLORA ONLINE 2011) was from Mackinac Island, and the species is essentially northern, although Voss and Reznicek (2012) do indicate its presence in Ionia Co.
- Boechera laevigata* (Willd.) Al-Shehbaz (*Arabis laevigata* of Cole and of Voss); Rock Cress; 6 Jun 1897 (MICH).
- Brassica juncea* (L.) Czern.; Indian Mustard, Chinese Mustard, Brown Mustard; 18 Jul 1900 (as *B. sinapistrum*) (MICH); Mulliken & L. J. Cole s.n., 24 Jun 1896 (MICH); Skeels s.n., 21 Aug 1896 (ALBC, MSC).
- Brassica nigra* (L.) W. D. J. Koch; Black Mustard; Skeels s.n., 25 Oct 1895 (MSC); Skeels & Shaddick s.n., 25 Aug 1895 (MSC). Cole notes that this species is a common weed.
- Brassica rapa* L.; Field Mustard, Turnip; 5 Jun 1898 (as *B. alba* = *Sinapis alba*) (MICH).
- Camelina microcarpa* DC. (*Camelina sativa* of Cole); Small-fruited False Flax; Hannah s.n., 30 May 1894, 1 Jun 1894, 10 Jun 1894 (MICH). Cole treated this as *C. sativa*, indicating it was becoming frequent along roadsides and in fields; however Reznicek (pers. comm. 2017) suggests that during Cole's day, *C. microcarpa* was often included within *C. sativa*; three specimens collected as *C. sativa* by George Hannah from Grand Rapids (with a Grand Rapids Public Museum number) have been annotated as *C. microcarpa* (MICHIGAN FLORA ONLINE 2011). Voss and Reznicek (2012) do not indicate *C. sativa* for Kent Co., and for only five counties in the state.
- Capsella bursa-pastoris* (L.) Medik.; Shepherd's-Purse; 25 May 1893 (MICH); Mulliken s.n., 10 Jun 1895 (MICH); Albert Shaddick s.n. 27 Apr 1896 (MSC); Skeels s.n. 26 Dec 1895 (MSC).
- Cardamine bulbosa* (Muhl.) Britton, Stearns, & Poggenb. (*Cardamine rhomboidea* and *C. purpurea* of Cole); Spring Cress; 20 May 1893 (as *C. rhomboidea*) (MICH); L. J. Cole s.n., 15 May 1895 (MSC); Shaddick & Fyfe s.n., 10 May 1895 (MSC); Skeels & Shaddick s.n. 19 May 1895 (MSC).
- Cardamine concatenata* (Michx.) Alph. Wood (*Dentaria laciniata* of Cole and of Voss); Two-leaved Toothwort; 1 Jun 1894, 10 May 1896 (MICH); H. M. Bailey s.n., May 1891 (MICH); Mulliken & L. J. Cole s.n., 17 Apr 1896 (MICH); Sones s.n., 20 Apr 1889 (MICH).
- Cardamine diphylla* (Michx.) O. Schwarz (*Dentaria laciniata* of Cole and of Voss); Cut-leaved Toothwort; 5 May 1893 (MICH); H. M. Bailey s.n., 9 May 1891 (MICH).
- Cardamine douglassii* Britton (*C. rhomboidea purpurea* of Cole); Pink Spring Cress; 1 May 1893, 18 May 1898 (MICH); H. M. Bailey s.n., 30 Apr 1892 (MICH); Mulliken s.n., 17 Apr 1896 (MICH); Shaddick & Fyfe s.n., 10 May 1895 (MSC); Skeels & Shaddick s.n., 19 May 1895 (MSC); Sones s.n., 6 May 1889 (MICH).
- Cardamine pensylvanica* Willd. (including *C. flexuosa* and *C. parviflora* of Cole); Bitter Cress; 3 May 1895 (MICH). Cole's *Flora* included *C. flexuosa*, *C. parviflora*, and *C. pensylvanica* as distinct taxa, but *C. parviflora* is a native northern species known in Michigan only from the Upper Peninsula, and *C. flexuosa* is a sparingly adventive European species unknown in western Michigan. *Cardamine pensylvanica* is our common species of wet sites.
- Cardamine pratensis* L.; Cuckoo-flower; Skeels s.n., 8 May 1895 (MSC); H. B. Fallas s.n., 14 May 1895 (MSC).
- Descurainia pinnata* (Walter) Britton (*Sisymbrium canescens* of Cole); Tansy Mustard; 22 June 1897, 24 June 1997 (MICH). Voss and Reznicek (2012) indicate that the first record for Michigan was from Kent Co in 1879.
- Diplotaxis muralis* (L.) DC.; Sand Rocket, Wall Rocket; Skeels s.n., 19 Sep 1895 (MSC). This, the first record of this species for Michigan, appeared at the Fremont Skeels property at Burton St. and Jefferson Ave. (Cole 1901, Voss and Reznicek 2012). According to Cole, seeds were taken to M.A.C. and planted in the Botanical Garden from where it soon spread.
- Draba reptans* (Lam.) Fernald (*Draba caroliniana* of Cole); Common Whitflow-grass; Jun 1892 (MICH); Matteson 167 (MSC). **THREATENED.**

- Erysimum capitatum* (Hook.) Greene (*Erysimum asperum* of Cole); Western Wall-Flower; 13 Jun 1900 (MICH). This first record for Michigan, collected by Cole; Felt-boot factory refuse, Phillips farm (see Table 2).
- Erysimum cheiranthoides* L.; Wormseed Mustard; 11 Jul 1896, 20 Jul 1896 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (CU), 25 Aug 1895 (MSC).
- Lepidium campestre* (L.) R. Br.; Field Cress; *M. B. Fallass* s.n., Jun 1899 (as *Arabis confinis*) (ALBC).
- Lepidium densiflorum* Schrad.; Pepper-grass (*Lepidium intermedium* Gray of Cole); 1 Jun 1894 (MICH); *H. M. Bailey* s.n., 27 Jun 1892 (MICH).
- Lepidium virginicum* L.; Pepperwort; 1 Jun 1894 (MICH); *H. M. Bailey* s.n., Aug 1891, 28 Jun 1892 (MICH); *Mulliken* s.n., 2 Jun 1895 (MSC), 6 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 14 Jul 1895 (MSC); *Sones* s.n., 14 Jul 1889 (MICH).
- Lobularia maritima* (L.) Desv.; Sweet Alysum; *M. B. Fallass* s.n., Aug 1894 (ALBC). The first collection for Michigan (MICHIGAN FLORA ONLINE 2011); apparently escaped from cultivation.
- Nasturtium microphyllum* Rchb. (*N. officinale* of Cole and of Voss); Watercress; 18 Jun 1893, 29 May 1898 (as *Cardamine flexuosa*) (MICH); *L. J. Cole* s.n., 8 Jun 1895 (MSC); *Skeels & Shaddick* s.n., 14 Jul 1895 (as *N. officinale*) (MSC).
- Nasturtium officinale* W. T. Aiton; Watercress; 18 Jun 1893 (MICH); *H. M. Bailey* s.n., Jun 1891 (MICH); *Mulliken* s.n., 4 May 1896 (MICH).
- Rorippa aquatica* (Eaton) E. J. Palmer & Steyer. (*Nasturtium lacustre* of Cole; *Armoracea aquatica* of Voss); Lake Cress; 9 Jul 1897 (MICH); *Sones* s.n., 14 Jul 1890 (MICH). Cole notes that the species was found near the Glue Factory (then in Walker Twp., Sec. 35), along Grand River and Market St. SW, adjacent to the Sewage Disposal Plant; the plants were, even then, scarce. **THREATENED.**
- Rorippa palustris* (L.) Besser (*Nasturtium palustre* of Cole); Yellow Cress, Marsh Cress; 20 Jun 1895, 11 Aug 1896, 15 Oct 1898 (MICH); *Mulliken* s.n., 28 Jun 1895 (MICH); *Skeels* s.n., 19 Jul 1895 (MICH).
- Rorippa sylvestris* (L.) Besser; Yellow Cress; Jun 1899 (ALBC); 7 Sep 1899 (MICH).
- Raphanus sativus* L.; Radish; *Skeels* s.n., 19 Sep 1895 (MSC). Cole, treating the plants as *R. raphanistrum*, indicated that it was frequent west and south of the City, growing in "fallow and waste ground."
- Sinapis alba* L. (*Brassica alba* of Cole); White Mustard; *C. W. Fallass* s.n., 14 Jun 1894 (ALBC). Only 7 records of this are in the database of MICHIGAN FLORA ONLINE (2011), all old; only the Fallass specimen from a dumping place near Reed's Lake documents it for the *Flora*.
- Sinapis arvensis* L.; (*Brassica sinapistrum* of Cole; *B. kaber* of Voss); Charlock, Wild Mustard; 13 Jun 1897 (as *B. nigra*), 5 Jun 1898 (as *B. alba*), 18 Jul 1900 (as *B. sinapistrum*) (MICH); *Mulliken* s.n., 12 Jul 1895 (MICH); *Mulliken & L. J. Cole* s.n., 24 Jun 1896 (MICH); *Sones* s.n., 20 Jun 1890 (MICH).
- Sisymbrium altissimum* L.; Tumble Mustard; *C. W. Fallass* s.n., 8 Jul 1897 (MSC).
- Sisymbrium loeselii* L. (*Sisymbrium irio* of Cole); Small Tumbleweed Mustard; June 1900 (GH); 13 June 1900, MICH); June 1900 (MSC). Cole suggested that this Eurasian adventive may have been introduced by use of refuse from Felt-Boot Factory as fertilizer on the Phillips farm (see Table 2.)
- Sisymbrium officinale* (L.) Scop.; Hedge Mustard; 20 Jun 1893 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).
- Turritis glabra* L. (*Arabis perfoliata* of Cole; *Arabis glabra* of Voss); Tower Mustard; 20 Jun 1893 (MICH); *Mulliken* s.n., 28 Jul 1897 (MICH); *Skeels* s.n., 2 Aug 1895 (MSC).

CABOMBACEAE (Water-shield Family)

Brasenia schreberi J. F. Gmel. (*Brasenia peltata* of Cole); Water-shield; Aug 1899 (MICH).

CAMPANULACEAE (Bellflower Family)

Campanula aparinoides Pursh; Marsh Bellflower; 20 Jul 1893 (MICH); *H. M. Bailey* s.n., 12 Jul 1892 (MICH); *Mulliken* s.n., 16 Jul 1895 (MICH); *Mulliken & L. J. Cole* s.n., 27 Jun 1896 (MICH).

Campanula rotundifolia L.; Bluebell, Harebell; 1 Jul 1893 (MICH); *H. M. Bailey* s.n., 12

May 1891 (MICH); *Mulliken* s.n., 22 Jun 1895 (MICH); *Shaddick & Fyfe* s.n., 14 May 1895 (MSC); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Campanula rapunculoides L.; Roving Bellflower, Creeping Bellflower; *Skeels & Shaddick* s.n., 26 Aug 1896 (MICH).

Campanulastrum americanum (L.) Small (*Campanula americana* of Cole); Tall Bellflower, American Bellflower; 13 Aug 1891 (MICH); *Mulliken* s.n., 21 Jul 1897 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC); *Sones* s.n., 19 Jul 1889, 19 Jul 1890 (MICH).

Lobelia cardinalis L.; Cardinal-flower, Red Lobelia; 1 Aug 1893 (MICH); *H. M. Bailey* s.n., 15 Aug 1891 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).

Lobelia siphilitica L.; Great Blue Lobelia; 1 Sep 1893 (MICH); *H. M. Bailey* s.n., 12 Aug 1891 (MICH).

Lobelia inflata L.; Indian-tobacco; 3 Aug 1893, 7 Aug 1896 (MICH); 10 Aug 1897 (MICH).

Lobelia kalmii L.; Kalm's Lobelia, Brook Lobelia, Bog Lobelia; 30 Aug 1893 (MICH).

Lobelia siphilitica L.; Great Blue Lobelia; 1 Sep 1893 (MICH); *Mulliken* s.n., 19 Aug 1897 (MICH).

Lobelia spicata Lam.; Pale Spiked Lobelia; 30 Jun 1893 (MICH); *Mulliken* s.n., 24 Jul 1895 (MICH).

Triodanis perfoliata (L.) Nieuwl. (*Specularia perfoliata* of Cole); Venus's Looking-glass; Jun 1894, 25 Jun 1894 (MICH); *H. M. Bailey* s.n., 27 Jun 1892 (MICH).

CANNABACEAE (Hemp Family)

Celtis occidentalis L.; Hackberry; 23 Jul 1896 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH, MSC); *Sones* s.n., 21 Sep 1891 (MICH).

Cannabis sativa L.; Hemp, Marijuana; *Sones* s.n., s.d. (MICH). Cole notes that the species occurred on waste ground and was frequent—no doubt persisting from cultivation for fiber, which was once common in Michigan.

Humulus lupulus L.; Hop, Common Hops; 2 Aug 1901 (MICH); *Skeels* s.n. 17 Jul 1895 (MICH). Cole indicates that this native plant was frequent along railroad embankments and streambanks. Voss and Reznicek (2012) indicate that the original range in Michigan is obscure, due to its commonly cultivated history, and that most records probably represent persistence from cultivation.

CAPRIFOLIACEAE (Honeysuckle Family)

Lonicera canadensis Marshall (*Lonicera ciliata* of Cole); Canadian Fly Honeysuckle; *H. M. Bailey* s.n., 24 Jun 1892 (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC); *Sones* s.n., 26 Apr 1899 (MO).

Lonicera dioica L. (*Lonicera glauca* of Cole); Glaucous Honeysuckle, Red Honeysuckle; 28 May 1901 (MICH); *L. J. Cole* s.n., 4 Jul 1896 (MSC); *Mulliken* s.n., 10 Jul 1897 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MSC).

Lonicera oblongifolia (Goldie) Hook.; Swamp Fly Honeysuckle; 11 Jul 1896, 6 Jul 1899 (MICH).

Symphoricarpos albus (L.) S. F. Blake (*Symphoricarpos racemosus* of Cole); Snowberry.

Symphoricarpos occidentalis Hook.; Wolfberry; 3 Sep 1899 (MICH). This western species was apparently used as an ornamental; collection from "along street" in Plainfield Village.

Symphoricarpos orbiculatus Moench (*Symphoricarpos vulgaris* of Cole); Coralberry; 15 Jul 1899 (MICH). Cole notes that the plants were collected from a roadside near an old foundation; most certainly escaping from cultivation.

Triosteum aurantiacum E. P. Bicknell (*Triosteum perfoliatum* of Cole); Horse-gentian; 10 Jun 1894 (MICH); *Mulliken* s.n., 22 May 1897 (MICH); *Sones* s.n., 21 May 1889 (MICH). Voss and Reznicek (2012) indicate that some authors regard this taxon as *T. perfoliatum* var. *aurantiacum*, but they recognize *T. aurantiacum* as a species distinct from *T. perfoliatum*, and Cole's specimen fits *T. aurantiacum*.

CARYOPHYLLACEAE (Pink Family)

Agrostemma githago L. (*Lychnis githago* of Cole); Corn-cockle; 4 Jul 1893 (MICH); *H. M. Bailey* s.n., 24 Jun 1892 (MICH); *Shaddick & Fife* s.n., 30 May 1896 (MSC).

Arenaria serpyllifolia L.; Thyme-leaved Sandwort; 1 May 1894 (MICH); *Mulliken* s.n., 24 May 1896 (MSC); *Shaddick, Fyfe, Mulliken & Cole* s.n., 24 May 1896 (MSC).

Cerastium fontanum Baumg. (*Cerastium vulgatum* of Cole); Chickweed; *H. M. Bailey* s.n.,

- 6 Jul 1892, 30 May 1893 (MICH); *M. B. Fallass* s.n., 15 May 1894 (MICH); *Shaddick, Mulliken & Fyfe* s.n., s.n., 24 May 1896; *Skeels & Shaddick* s.n., 7 Sep 1895 (MSC).
- Cerastium nutans* Raf.; Nodding Mouse-ear Chickweed. *Hyser* s.n., s.d. (Plainfield Village) (MICH).
- Dianthus deltoides* L.; Maiden Pink; 8 Jun 1898 (MICH).
- Minuartia michauxii* (Fenzl) Farw. (*Arenaria michauxii* of Cole; *Arenaria stricta* of Voss); Rock Sandwort; 10 Jun 1893 (MICH); *H. M. Bailey* s.n., 28 Jun 1892 (MICH); *Mulliken* s.n., 1 Jun 1895 (MICH).
- Petrorhagia prolifera* (L.) P. W. Ball & Heywood (*Dianthus prolifera* of Cole); Childing Pink. Cole states: "Escaped from a garden near the Buchanan S. School Building (Mrs. E. P. Stephenson)," but no specimen exists for Kent Co., and the first documentation for Michigan (Ottawa Co.) was not made until 1976 (Voss and Reznicek 2012).
- Saponaria officinalis* L.; Bouncing Bet, Soapwort; 10 Sep 1896 (MICH); *M. B. Fallass* s.n., Jul 1896 (MICH); *Mulliken* s.n., 4 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).
- Scleranthus annuus* L.; Knawel; 8 Jun 1900 (MICH); *Skeels & Shaddick* s.n., 14 Oct 1895 (MICH, MSC), 14 Oct 1895 (MSC).
- Silene antirrhina* L.; Sleepy Catchfly; 28 Jun 1893, 10 Jun 1894 (MICH); *H. M. Bailey* s.n., 3 Jun 1892 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC).
- Silene coronaria* (L.) Clairv. (*Lychnis coronaria* of Cole and of Voss); Mullein Pink; *C. W. Fallass* s.n., Aug 1884 (ALBC). Cole notes that this garden escape has "maintained itself for more than 35 years in Sec. 32, Vergennes." This was within a mile of her childhood home.
- Silene latifolia* Poir. (*Lychnis alba* of Cole; *Silene pratensis* of Voss); White Cockle, White Champion; *Mulliken* s.n., 15 Jun 1897 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH, MSC), 11 Aug 1896 (MSC).
- Silene noctiflora* L.; Night-flowering Catchfly; *H. M. Bailey* s.n., 24 1892 (MICH).
- Stellaria longifolia* Willd.; Long-leaved Chickweed, Long-leaved Stitchwort; *H. M. Bailey* s.n., 30 Jun 1892 (MICH).
- Stellaria media* (L.) Vill.; Common Chickweed; *M. B. Fallass* s.n., s.d. (MICH).

CELASTRACEAE (Bittersweet Family)

- Celastrus scandens* L.; Climbing Bittersweet, American Bittersweet; 20 Jul 1895 (fruting specimen from Grand Rapids) (MICH); *Mulliken* s.n., 24 May 1896 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC). The now widespread aggressive climbing vine *C. orbiculatus* (Oriental Bittersweet), commonly sold in farmers' markets as decorative branches, swags, and wreaths, was not documented in the state as adventive until 1976 (Voss and Reznicek 2012).
- Euonymus atropurpureus* Jacq.; Burning-bush, Wahoo; 1 Aug 1896, 4 Oct 1896 (MICH); *Skeels & E. J. Cole* s.n., 7 Aug 1896 (MICH, MSC). Cole notes that this species found along Grand River at West Bridge Street Ferry, Boynton's Landing, church picnic grounds in Jenison in Ottawa Co., and in Kent Co. along Grand River in Plainfield Village and woods south of Reed's Lake was "formerly frequent, but it has been dug up and sold for medicinal purposes; now it is chiefly found in unfrequented places." **SPECIAL CONCERN.**
- Euonymus obovatus* Nutt. (*Euonymus americanus obovatus*); Running Strawberry-bush; 15 May 1893 (MICH); *C. W. Fallass* s.n., 19 May 1894 (ALBC); *Sones* s.n., 22 May 1889 (MICH).

CERATOPHYLLACEAE (Hornwort Family)

- Ceratophyllum demersum* L.; Coontail; 27 Oct 1897 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH).

CISTACEAE (Rockrose Family)

- Crocanthemum canadense* (L.) Britton (*Helianthemum canadense* of Cole and of Voss); Common Frostweed; 20 Jun 1893, 18 Jul 1896 (as *Lechea major*) (MICH); *H. M. Bailey* s.n., 1 Jul 1891, 13 Jun 1892 (MICH); *Skeels* s.n., 13 Sep 1895 (MSC).
- Lechea mucronata* Raf. (*Lechea major* of Cole; *L. villosa* of Voss); Hairy Pinweed; 18 Jul 1896, 25 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 7 Sep 1895, 23 Aug 1896 (MSC).

CLEOMACEAE (Spider-plant Family)

Peritoma serrulata (Pursh) DC. (*Cleome integrifolia* of Cole; *C. serrulata* of Voss); Rocky Mountain Bee Plant; 15 Sep 1899 (MICH); Mulliken s.n., 10 Aug 1895, 10 Aug 1895 (MICH).

Polanisia dodecandra (L.) DC. (*Polanisia graveolens* of Cole); Clammy-weed; Hyser s.n., 20 Sep 1898 (MICH).

CONVOLVULACEAE (Morning-glory Family)

Convolvulus arvensis L.; Field Bindweed; Knappen s.n., 25 Jun 1892 (MICH). Cole says this is “[a] troublesome weed and very difficult to exterminate.”

Calystegia sepium (L.) R. Br. (*Convolvulus sepium* of Cole); Hedge Bindweed; 23 Jul 1896, 17 Jun 1898 (MICH); L. J. Cole s.n., 4 Jul 1896 (MSC); H. M. Bailey s.n., 25 Jun 1892 (MICH); Mulliken s.n., 25 Jun 1895, 7 Jun 1896 (MICH). Skeels s.n., 26 Aug 1896 (MSC); Skeels & Shaddick s.n., 26 Aug 1896 (MSC); Sones s.n., 9 Jul 1890 (MICH).

Calystegia spithamea (L.) Pursh (*Convolvulus spithameus* of Cole); Low Bindweed; 25 Jun 1897 (MICH); H. M. Bailey s.n., 29 Jun 1891 (MICH).

Cuscuta groenovii Roem. & Schult.; Common Dodder, Swamp Dodder; 14 Aug 1898 (MICH); Mulliken & L. J. Cole s.n., 19 Aug 1897 (MICH); Skeels s.n., 25 Aug 1894 (MSC); Skeels & Shaddick, s.n., 25 Aug 1895 (MSC); Sones s.n., 13 Aug 1891 (MICH).

Ipomoea pandurata (L.) G. Mey.; Wild Sweet Potato, Man-of-the-earth; Skeels & Shaddick s.n., 25 Aug 1895 (MSC). Interestingly, this rare plant was collected in the City at Wallen’s Tannery. **THREATENED.**

Ipomoea purpurea (L.) Roth.; Common Morning-glory; Skeels & Shaddick s.n., 7 Sep 1895 (MSC).

CORNACEAE (Dogwood Family)

Cornus alternifolia L. f.; Alternate-leaved Dogwood, Pagoda Dogwood; 6 Jun 1893 (MICH); H. M. Bailey s.n., 29 May 1891 (MICH); Skeels & Shaddick s.n., 21 Jul 1895 (MSC); Skeels, Shaddick, B. E. Livingston & Fyfe s.n., 21 Jul 1895 (MICH).

Cornus amomum Mill. (*Cornus sericea* of Cole); Pale Dogwood, Silky Dogwood; 28 Aug 1895 (MO), 2 Jul 1902 (MICH); H. M. Bailey s.n., 24 Jun 1892 (MICH).

Cornus canadensis L.; Bunchberry, Dwarf Cornel; Matteson s.n., 12 Jun 1893 (MSC).

Cornus florida L.; Flowering Dogwood; 1 Jun 1894 (MICH); H. M. Bailey s.n., 23 May 1891, 24 Oct 1891 (MICH); Mulliken s.n., 9 May 1896 (MICH). Skeels s.n., 13 Nov 1895 (MSC); Shaddick & Fyfe s.n., 23 May 1897 (MSC).

Cornus foemina Mill. (*Cornus candidissima* of Cole); gray dogwood; 30 Jun 1893 (as *C. paniculata*) (MICH); Mulliken s.n., 10 Jun 1895, 12 Jun 1895, 13 Sep 1897 (MICH); Shaddick & Fyfe s.n., 25 May 1896 (as *C. paniculata*) (MSC); Skeels s.n. 29 Sep 1895 (as *C. paniculata*) (MSC).

Cornus rugosa Lam. (*Cornus circinata* of Cole); 22 Jun 1896, 25 Aug 1896 (MICH).

Cornus sericea L.; Red-osier Dogwood (*Cornus stolonifera* of Cole and of Voss); H. M. Bailey s.n., 15 Jul 1892 (MICH); Skeels s.n., 19 Jul 1895 (MICH, MSC).

CRASSULACEAE (Orpine or Stonecrop Family)

Sedum acre L.; Mossy Stonecrop; H. M. Bailey s.n., 28 Jun 1892 (MICH); Mulliken s.n., 16 Jun 1895 (MICH); Skeels s.n., 18 Aug 1895 (MICH, MSC).

Hylotelephium telephium (L.) H. Ohba (*Sedum telephium* of Cole and of Voss); Live Forever; 1 Aug 1893 (MICH).

CUCURBITACEAE (Gourd Family)

Echinocystis lobata (Michx.) Torr. & A. Gray; Wild-cucumber; 24 Sep 1893 (MICH); H. M. Bailey s.n., 26 Aug 1893 (MICH); Sones s.n., 1 Aug 1890 (MICH).

DIERVILLACEAE (Bush-honeysuckle Family)

Diervilla lonicera Mill. (*Diervilla trifida* of Cole); Bush-honeysuckle; 28 Jun 1893 (MICH); H. M. Bailey s.n., 3 Jul 1891 (MICH); Shaddick, Fyfe & Mulliken s.n., 24 May 1896 (MICH, MSC).

DIPSACACEAE (Teasel Family)

Dipsacus fullonum L. (*Dipsacus sylvestris* Mill. of Cole); Wild Teasel; R. Slater and Darling

s.n. 20 Oct. 1898 (MICH). Cole notes a few plants growing on the farm of George Slater along the highway in Paris Twp. What is surprising is that Cole states: "Untilled ground; rare." Today it is incredibly abundant along our roadsides.

DROSERACEAE (Sundew Family)

Drosera intermedia Hayne; Spatulate-leaved Sundew; 25 Jul 1893, 21 Jul 1898 (MICH); Mulliken s.n., 4 Aug 1896 (MICH); Skeels, Shaddick, Mulliken, & Wolcott s.n., 4 Aug 1896 (ALBC, MSC).

Drosera rotundifolia L.; Round-leaved Sundew; 20 Jul 1893 (MICH); L. J. Cole s.n., 4 Jul 1896 (MSC); Skeels & Shaddick s.n., 2 Aug 1896 (MSC); Skeels, Shaddick, B. E. Livingston, & Fyfe s.n., 21 Jul 1895 (MSC).

ERICACEAE (Heath Family)

Andromeda glaucophylla Link (*Andromeda polifolia* of Cole); Bog-rosemary; [L. J.] Cole s.n., 4 Jul 1896 (MSC); Mulliken s.n., 4 Aug 1896 (MICH); Skeels & Shaddick s.n., 14 Jul 1895 (MICH, MSC).

Arctostaphylos uva-ursi (L.) Spreng.; Bearberry, Kinnikinick; 14 May 1898, Oct 1898 (fruit, on same sheet) (MICH); Skeels & Shaddick s.n., 29 Oct 1897 (MSC).

Chamaedaphne calyculata (L.) Moench. (*Cassandra calyculata* of Cole); Leatherleaf; Skeels & Shaddick s.n., 14 Jul 1895 (MSC); H. M. Bailey s.n., 25 Apr 1891, 6 Aug 1892 (MICH).

Chimaphila maculata (L.) Pursh; Spotted Wintergreen; 21 Jul 1897 (MICH); H. M. Bailey s.n., 3 Jul 1891 (MICH); Mulliken s.n., 12 Jul 1897 (MICH); Sones s.n., Jul 1892 (MICH).

Chimaphila umbellata (L.) Nutt.; Pipsissewa, Prince's-pine; 2 Jul 1893 (MICH); Skeels s.n., 18 Aug 1895 (MICH); Skeels & Shaddick s.n., 18 Aug 1895, 18 Aug 1895 (MSC).

Epigaea repens L.; Trailing-arbutus; H. M. Bailey s.n., 2 Apr 1891 (MICH); Shaddick, Fyfe & Fuller s.n., 14 Apr 1895 (MSC); Skeels & Shaddick s.n., 29 Mar 1898 (MSC); Sones s.n., 6 Apr 1889 (MICH).

Gaultheria hispidula (L.) Bigelow (*Chiogenes serpyllifolia* of Cole); Creeping-snowberry; 8 Jul 1896, 8 Jul 1896 (MICH); H. M. Bailey s.n., 24 Jul 1891 (MICH).

Gaultheria procumbens L.; Wintergreen, Teaberry; 30 Jun 1893 (MICH); 18 Jul 1896 (MICH); L. J. Cole s.n., 4 Jul 1896 (MSC); Skeels & Shaddick s.n., 19 May 1895 (MSC), Skeels & Shaddick s.n., 14 Jul 1895 (MICH).

Gaylussacia baccata (Wangenh.) K. Koch (*Gaylussacia resinosa* of Cole); Huckleberry, Crackleberry; 20 May 1893, 15 Aug 1898 (MICH); C. W. Fallass s.n., 19 May 1894 (ALBC); Mulliken s.n., 18 Jul 1896, 31 May 1897 (MICH).

Hypopitys monotropa Crantz (*Monotropa hypopitys* of Cole and of Voss); Pinesap, False Beech-drops; 25 Aug 1899 (MICH).

Monotropa uniflora L.; Indian-pipe; 8 Jul 1901 (MICH); H. M. Bailey s.n., 3 Jul 1891 (MICH); Mulliken & L. J. Cole s.n., 18 Jul 1896 (MICH); Skeels & Shaddick s.n., 18 Aug 1895 (MSC); Sones s.n., 12 Sep 1891 (MICH).

Orthilia secunda (L.) House (*Pyrola secunda* of Cole); One-sided Pyrola; 20 Jul 1893 (MICH); L. J. Cole & Mulliken s.n., 18 Jul 1896 (MSC); H. M. Bailey s.n., 1 Jul 1892 (MICH); M. B. Fallass s.n., Jul 1894 (MICH); Shaddick s.n., 18 May 1895 (MICH); Skeels & Shaddick s.n., 19 May 1895 (MSC).

Pyrola americana Sweet (*Pyrola rotundifolia* of Cole and of Voss); Round-leaved Pyrola; 5 Jul 1899 (MICH); H. M. Bailey s.n., 3 Jul 1891 (MICH); Skeels s.n., 21 Jul 1895 (MICH); Skeels, Shaddick, B. E. Livingston, & Fyfe s.n., 21 Jul 1895 (MSC).

Pyrola asarifolia Michx. (*Pyrola rotundifolia uliginosa* of Cole); Pink Pyrola; 20 Jul 1897 (MICH).

Pyrola chlorantha Sw.; Shinleaf; Mulliken s.n., 24 May 1896 (MSC); Shaddick, Fyfe & Milliken s.n., 24 May 1896 (MSC).

Pyrola elliptica Nutt.; Large-leaved Shinleaf; 20 Jul 1893 (MICH); H. M. Bailey s.n., 3 Jul 1891 (MICH); Mulliken s.n., 7 Jun 1895, 4 Jul 1895 (MICH).

Rhododendron groenlandicum (Oeder) Kron & Judd (*Ledum groenlandicum* of Cole and of Voss); Labrador-tea. Cole notes that this is a "rare" plant, citing 2 sphagnous localities now destroyed—Burton Avenue Swamp and Saddle-Bag Swamp—but "no specimens preserved." She also includes this species in a list of "species [that] have apparently disappeared..." in the Introduction to her *Flora*.

Vaccinium angustifolium Aiton (*Vaccinium pennsylvanicum* of Cole); Low Sweet Blueberry; 12 May 1893, 18 Jul 1897 (as *V. vacillans*) (MICH); *L. J. Cole* s.n., 15 May 1895 (as *V. vacillans*) (MSC); *Mulliken* s.n., 14 May 1897 (MICH); *Skeels & Shaddick* s.n., 12 May 1895, 16 Aug 1896 (MSC).

Vaccinium corymbosum L.; Highbush Blueberry; 22 May 1896, 1 Jul 1897 (as *V. corymbosum amoenum*), 15 Jul 1898 (as *V. canadense*), 23 May 1900 (as *V. corymbosum atrococcum*), 28 Jun 1900 (as *V. corymbosum atrococcum*) (MICH); *Mulliken* s.n., 10 May 1896 (MICH); *Shaddick & Fyfe* s.n., 25 May 1895 (MSC); *Sones* s.n., 10 May 1889 (MICH).

Vaccinium macrocarpon Aiton; Large Cranberry; 13 Jun 1896, 21 Jul 1898 (as *V. oxycoccus*) (MICH); *Mulliken* s.n., 15 Jul 1896 (as *V. oxycoccus*) (MICH); *Skeels, Shaddick, B. E. Livingston, Fyfe* s.n., 21 Jul 1895 (as *V. oxycoccus*) (MSC); *Sones* s.n., 30 Jun 1888 (as *V. oxycoccus*) (MICH).

Vaccinium myrtilloides Michx. (*Vaccinium canadense* of Cole); Velvetleaf Blueberry, Canada Blueberry; 10 Jul 1896 (MICH); *L. J. Cole* s.n., 5 May 1895 (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC).

Vaccinium oxycoccus L.; Small Cranberry; 1 Sep 1895, 20 Jul 1898 (MICH); *L. J. Cole* s.n., 4 Jul 1896 (MSC); *Mulliken* s.n., 4 Aug 1896 (MICH); *Skeels & Shaddick* s.n., 4 Aug 1896 (MSC).

Vaccinium pallidum Aiton (*Vaccinium vacillans* of Cole); Dryland Blueberry, Hillside Blueberry; 20 Jun 1897 (MICH); *Mulliken* s.n., 22 May 1896 (MICH).

EUPHORBIACEAE (Spurge Family)

Acalypha rhomboidea Raf. (*Acalypha virginica* of Cole); Three-seeded Mercury; 6 Sep 1893, 25 Aug 1893 (MICH); 25 Sep 1892 (MICH).

Euphorbia commutata Engelm.; Tinted Spurge; 10 May 1896, 4 Oct 1896 (MICH).
THREATENED.

Euphorbia corollata L.; Flowering Spurge; 26 Jul 1893 (MICH); *M. B. Fallass* s.n., 29 Aug 1893 (MICH); *Mulliken* s.n., 18 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC).

Euphorbia cyparissias L.; Cypress Spurge; 10 May 1894 (MICH); 2 May 1894 (MICH); 29 May 1891 (MICH).

Euphorbia maculata L.; Spotted Spurge; 25 Jul 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Skeels* s.n., 19 Aug 1895 (MICH, MSC).

Euphorbia nutans Lag. (*Euphorbia preslii* of Cole); Eyebane; 10 Oct 1893 (GH), 10 Oct 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Mulliken* s.n., 31 Aug 1897 (MICH); *Skeels* s.n., 19 Aug 1895 (MICH, MSC).

Euphorbia peplus L.; Petty Spurge; *Skeels* s.n., 14 Aug 1896 (MICH), 19 Aug 1895 (as *E. preslii*), 24 Oct 1895 (MSC), 24 Oct 1895 (MSC), 16 Nov 1895 (as *E. preslii*) (ALBC, MICH, MSC), 27 Aug 1897 (MSC).

FABACEAE (Pea or Bean Family)

Amorpha canescens Pursh; Lead Plant; 21 Jul 1896, 24 Jul 1896 (MICH); *Hyser* s.n., 1899 (MICH). **SPECIAL CONCERN.**

Amphicarpaea bracteata (L.) Fernald (*Amphicarpaea monoica* of Cole); Hog-Peanut; 25 Aug 1892, 26 Aug 1899 (as *A. pitcheri*) (MICH); *H. M. Bailey* s.n., 28 Aug 1891 (MICH); *Skeels & Shaddick* s.n., 12 Oct 1895 (as *A. monoica*) (MSC).

Apios americana Medik. (*Apios tuberosa* of Cole); Ground-nut; 15 Aug 1893 (MICH); *H. M. Bailey* s.n., 28 Aug 1891 (MICH); *Mulliken* s.n., 10 Aug 1895 (MICH); *Sones* s.n., 24 Aug 1891, 2 Sep 1891 (MICH).

Astragalus canadensis L.; Canadian Milk-vetch; 20 Oct 1901 (MICH). This rare plant from the Plainfield Village was not collected early enough to be included in Cole's Flora, but is included here for completeness. **THREATENED.**

Astragalus neglectus (Torr. & A. Gray) E. Sheld. (*Astragalus cooperi* of Cole); Cooper's Milk-vetch. 20 Jul 1896 (MICH); *Mulliken* s.n., 15 Jun 1897, 15 Jun 1897, 21 Jul 1897 (MICH). **SPECIAL CONCERN.**

Cercis canadensis L.; Redbud, Judas Tree; 12 May 1894 (ALBC); *H. M. Bailey* s.n., 17 May 1891 (MICH); *Mulliken* s.n., 20 May 1897 (MICH).

- Desmodium canadense* (L.) DC.; Showy Tick-trefoil; 1 Aug 1893 (MICH); *H. M. Bailey* s.n., 11 Aug 1891, 15 Aug 1891 (MICH); *Mulliken* s.n., 2 Jul 1896 (MICH).
- Desmodium ciliare* (Willd.) DC.; Hairy Tick-trefoil; 2 Aug 1896 (as *D. marilandicum*) (MICH); *Sones* s.n., 9 Sep 1891 (MSC).
- Desmodium cuspidatum* (Willd.) Loud.; Smooth-bracted Tick-trefoil; 5 Aug 1896, 5 Aug 1896 (MICH); *H. M. Bailey* s.n., 29 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895, 2 Aug 1896 (MSC).
- Desmodium glabellum* (Michx.) DC. (*Desmodium marilandicum* of Cole); Tick-trefoil; 23 Jul 1896 (as *D. paniculatum*), 5 Aug 1896, 28 Aug 1899 (as *D. paniculatum*) (MICH); *Hyser* s.n., 26 Jul 1896 (MICH).
- Desmodium illinoense* A. Gray; Prairie Tick-trefoil; 28 Sep 1898 (ALBC); 21 Jul 1896, 25 Sep 1897 (MICH).
- Desmodium obtusum* (Willd.) DC. (*Desmodium rigida* of Cole); Stiff Tick-trefoil; 4 Sep 1899 (MICH).
- Desmodium paniculatum* (L.) DC. Panicked Tick-trefoil; 25 Aug 1893 (MICH); *H. M. Bailey* s.n., 15 Aug 1891 (MICH); *Mulliken* s.n., 18 Sep 1897 (MICH).
- Desmodium perplexum* B. G. Schub. (*Desmodium dillenii* of Cole; included in *D. paniculatum* of Voss); Tick-trefoil; 21 Jul 1896, 25 Jul 1896, 5 Aug 1896 (as *D. marilandicum*), 8 Sep 1899, 15 Sep 1899 (MICH); *H. M. Bailey* s.n., 29 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895 (MSC).
- Desmodium rotundifolium* DC.; Round-leaved Tick-trefoil; 20 Aug 1893 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (MICH), 18 Aug 1895, 18 Aug 1895 (MSC).
- Desmodium sessilifolium* (Torr.) Torr. & A. Gray; Sessile-leaved Tick-trefoil; 24 Jul 1896, 25 Sep 1897 (MICH).
- Gleditsia triacanthos* L.; Honey Locust; 8 Oct 1899 (MICH). Cole notes that a few trees grew along the Grand River, having sprouted on the farm of E. Pettis (Ada Twp., Sec. 21) from pods washed downstream on flood waters from a tree under cultivation in Ada Village.
- Gymnocladus dioica* (L.) K. Koch (*Gymnocladus canadensis* of Cole); Kentucky Coffeetree; 1900 (MSC); *Sones* s.n., 10 Jul 1889 (MICH). Cole comments that the species “reaches its northern limits in the Grand River Valley,” citing localities along the Grand River in Ada Twp., the Lower Swing Bridge (Wyoming), and near Ross Station (GR & I RR, Corinth, Byron Twp., Sec. 26). Other sites appear to have been planted.
- Hylodesmum glutinosum* (Willd.) H. Ohashi & R. R. Mill (*Desmodium acuminatum* of Cole; *D. glutinosum* of Voss); Clustered-leaved Tick-trefoil; *H. M. Bailey* s.n., 18 Jul 1892 (MICH); *Mulliken* s.n., 19 Jul 1897 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).
- Hylodesmum nudiflorum* (L.) H. Ohashi & R. R. Mill (*Desmodium nudiflorum* of Cole and of Voss); Naked Tick-trefoil; 25 Jul 1893 (MICH); *H. M. Bailey* s.n., 15 Aug 1891, 18 Jul 1892 (MICH); *Mulliken* s.n., 10 Aug 1897 (MICH).
- Lathyrus latifolius* L.; Everlasting Pea, Perennial Pea; *Mulliken* s.n., 28 Jun 1896 (MICH). Cole notes that this species was known as a “garden escape” persisting for some 30 years in the City prior to 1900; Voss and Reznicek (2012) indicate the the first voucher documenting it for Michigan was not collected until 1897 in Washtenaw Co., but *Mulliken*’s specimen indicates otherwise.
- Lathyrus ochroleucus* Hook.; Pale Vetchling; 1 Jun 1893 (MICH); *Mulliken* s.n., 10 May 1896 (MICH); *Sones* s.n., 20 May 1889 (MICH).
- Lathyrus palustris* L.; Marsh Pea; 20 Jul 1893, 13 Jun 1896, 17 Jun 1899 (as *L. myrtifolius*) (MICH); *H. M. Bailey* s.n., 15 Jun 1892 (MICH); *Sones* s.n., 13 Jun 1889 (MICH).
- Lathyrus venosus* Willd.; Veiny Pea; 9 Jun 1893 (MICH); *H. M. Bailey* s.n., 14 Jun 1892 (MICH); *C. W. Fallas* s.n., 17 May 1894 (ALBC); *Sones* s.n., 12 Jun 1889 (MICH).
- Lespedeza capitata* Michx.; Round-headed Bush-clover; 29 Aug 1896 (MICH); *Skeels* s.n., 13 Sep 1895 (MSC); *Sones* s.n., 26 Aug 1892 (MICH).
- Lespedeza hirta* (L.) Hornem. (*L. polystachya* of Cole); Hairy Bush-clover; 15 Aug 1893 (MICH); *Mulliken* s.n., 4 Sep 1891 (MICH); *Skeels* s.n., 13 Sep 1895 (MSC); *Skeels & Shaddick* s.n., 18 Aug 1895 (MICH, MSC); *Sones* s.n., 6 Aug 1892, 5 Sep 1892 (MICH).
- Lespedeza frutescens* (L.) Hornem. (*Lespedeza violacea* of Cole and of Voss); Violet Bush-clover; 25 Aug 1896 (MICH).

- Lespedeza violacea* (L.) Pers. (*Lespedeza reticulata* and *L. stuevei* of Cole; *L. intermedia* of Voss); Bush-clover; 10 Aug 1893 (as *L. stuevei intermedia*), Jul 1896 (as *L. stuevei intermedia*), 12 Aug 1896 (MICH); Mulliken s.n., 4 Sep 1897 (MICH); Skeels s.n., 20 Sep 1895 (as *L. stuevei intermedia*) (MSC); Skeels & Shaddick s.n., 18 Aug 1895, 23 Aug 1896 (both as *L. stuevei intermedia*) (MSC).
- Lespedeza virginica* (L.) Britton; Slender Bush-clover. Not in Cole's *Flora*, since the specimen was not collected until Oct 1901 (MICH).
- Lupinus perennis* L.; Wild Lupine; 12 May 1893, 29 May 1897 (MICH); H. M. Bailey s.n., 28 Jun 1892 (MICH); L. J. Cole s.n., 15 May 1895 (MSC); Mulliken s.n., 21 May 1895 (MICH); Skeels & Shaddick s.n., 12 May 1895 (MSC).
- Medicago lupulina* L.; Black Medick; 10 Jun 1894 (MICH); Mulliken & L. J. Cole s.n., 24 Jun 1896 (MICH); Skeels s.n., 2 Aug 1895 (MICH).
- Medicago minima* (L.) L.; Little Bur-clover. This species is not included in Voss and Reznicek (2012), although it is noted in a paragraph under *M. polymorpha*: "A collection from a farm at Grand Rapids (Kent Co.) in 1902 (E. J. Cole, MICH, ALBC) appears to be *M. minima* (L.) L., with fruit ± pubescent between the spines and weakly glandular on the surface; unlike in *M. polymorpha*, the stipules are at most shallowly toothed at the base; the stem is pubescent. Its status in 1902 is not clear, whether cultivated or a waif from contaminated seed." The Eurasian *M. minima* is added here because it came from the Phillips Farm, Paris Twp., Sec. 19, a site notorious for strange introductions, both from the southwestern U.S. (via wool) and odd weeds from Europe and Asia, brought as refuse from the Felt-Boot factory in the City to use as fertilizer. Cole, puzzled by these odd weedy species, sent specimens to M. L. Fernald for identification. See Table 2.
- Medicago sativa* L.; Alfalfa; Mulliken s.n., 6 Jul 1895 (MSC), 18 Jun 1896 (MICH, MSC); Shaddick s.n., 7 Sep 1895 (MSC); Skeels s.n., 13 Sep 1895 (MSC); Skeels & Shaddick s.n., 7 Sep 1895 (MSC); Sones s.n., 22 Sep 1889 (MICH).
- Melilotus albus* Medik.; White Sweet-clover; 2 Nov 1897 (MICH); H. M. Bailey s.n., 17 Sep 1891 (MICH); M. B. Fallass s.n., 20 Aug 1893 (MICH); Mulliken s.n., 4 Jun 1896 (MICH); Skeels & Shaddick s.n., 28 Jul 1895 (MSC).
- Melilotus officinalis* (L.) Pall.; Yellow Sweet-clover; 24 Jun 1897 (MICH); H. M. Bailey s.n., 22 Jun 1892 (MICH); Mulliken & L. J. Cole s.n., 24 Jun 1896 (MICH).
- Robinia pseudoacacia* L.; Black Locust; M. B. Fallass s.n., s.d. (MICH).
- Robinia viscosa* Vent.; Clammy Locust; Jun 1897, 15 Jun 1897 (MICH); H. M. Bailey s.n., s.d. (MICH). Cole notes, "escaped from cultivation, Reed Lake."
- Senna hebecarpa* (Fernald) H. S. Irwin & Barneby (*Cassia marilandica* of Cole, the name of a southern species; *C. hebecarpa* of Voss); Senna; 25 Aug 1893 (MICH); H. M. Bailey s.n., 12 Sep 1891 (MICH); Skeels & Shaddick s.n., 18 Aug 1895 (MICH, MSC). Once abundant at several localities.
- Tephrosia virginiana* (L.) Pers.; Goat's Rue; Rabbit-pea; 30 Jun 1901 (MICH); H. M. Bailey s.n., s.d. (MICH); Mulliken s.n., 13 Jun 1895 (MICH); Skeels & Shaddick s.n., 14 Jul 1895, flowers, (MICH, MSC) & 28 Jul 1895, fruit (same sheet); Skeels & Shaddick s.n., 25 Jul 1895, 28 Jul 1895 (MSC).
- Trifolium arvense* L.; Rabbitfoot Clover; 18 Jun 1901 (MICH); Skeels s.n., 30 Sep 1895 (MICH, MSC). Cole notes that this common weed of today was then "rare."
- Trifolium campestre* Schreb. (*Trifolium procumbens* of Cole); Low Hop Clover; 1 Jun 1901 (MICH); Shaddick s.n., 18 Jun 1896, 18 Jun 1896 (both as *T. procumbens*) (MSC); Sones s.n., 20 Jun 1889 (MICH).
- Trifolium dubium* Sibth.; Little Hop Clover; 5 Jun 1899 (as *T. procumbens*) (MICH); H. M. Bailey s.n., 30 Jun 1892 (MICH).
- Trifolium hybridum* L.; Alsike Clover; H. M. Bailey s.n., 22 Jun 1892 (MICH); C. W. Fallass s.n., 14 Jun 1894 (ALBC); Mulliken s.n., 19 Jun 1897 (MICH).
- Trifolium incarnatum* L.; Crimson Clover; Although Voss and Reznicek (2012) reports a handful of historical sites for this adventive, including its first collection in Ingham County in 1895, but none since 1939; no record is known to document Cole's inclusion of *T. incarnatum* in the her *Flora*. However, Cole notes that this adventive, native to the Mediterranean basin, has been "[r]ecently introduced into cultivation and is in the experimental stage in this section. Scarcely self-maintaining."

Trifolium pratense L.; Red Clover; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 15 Jul 1891 (MICH); *Mulliken* s.n., 27 Jul 1895 (MICH).

Trifolium repens L.; White Clover; 28 Jun 1893 (MICH); *H. M. Bailey* s.n., 15 Jul 1892 (MICH); *Mulliken* s.n., 6 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC).

Vicia americana Willd.; American Vetch; 6 Jun 1893 (MICH); *H. M. Bailey* s.n., 13 Jun 1892 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 16 May 1896 (MICH).

Vicia caroliniana Walter; Pale Vetch, Wood Vetch; 12 May 1893 (MICH); *H. M. Bailey* s.n., 17 May 1891 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 16 May 1895 (MICH); *Skeels & Shaddick* s.n., 12 May 1895 (MSC).

FAGACEAE (Beech or Oak Family)

Fagus grandifolia Ehrh. (*Fagus ferruginea* of Cole); American Beech; 1 May 1896 (MICH); *Mulliken* s.n., 2 May 1896 (MICH); *Shaddick & Fyfe* s.n., 25 May 1895 (MSC).

Quercus alba L.; White Oak; 8 Aug 1896 (MICH); *Skeels & Shaddick* s.n., 12 May 1895, 16 Aug 1896 (MSC).

Quercus bicolor Willd.; Swamp White Oak; 7 Aug 1896, 17 May 1899 (MICH); *Skeels* s.n., 7 Aug 1896 (MSC).

Quercus ellipsoidalis E. J. Hill (*Quercus coccinea* of Cole and of Voss); Hill's Oak; 10 Jul 1899, 2 Sep 1900 (MICH), both specimens annotated as hybrids with *Q. velutina* (= *Q. × palaeolithicola* Trel.).

Quercus macrocarpa Michx.; Bur Oak; 6 May 1893 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH); *Sones* s.n., 23 Sep 1890 (MICH).

Quercus muehlenbergii Engelm.; Chinquapin Oak, Yellow Chestnut Oak; 1 Sep 1896, 10 May 1901 (MICH); *L. J. Cole* s.n., 15 May 1895 (MICH); *Skeels* s.n., 26 Aug 1896 (CU).

Quercus prinoides Willd.; Dwarf Chinquapin Oak, Dwarf Chestnut Oak; 4 Aug 1896 (MICH); *Skeels & Shaddick* s.n., 10 May 1895 (MICH).

Quercus rubra L.; Red Oak; 8 Aug 1896, 5 May 1900, 1 Oct 1901 (MICH); *Sones* s.n., 25 Oct 1890 (MICH). One specimen has been annotated as the hybrid *Q. rubra* × *Q. ellipsoidalis*, *Daniels* s.n., 2 Oct 1899 (MSC).

Quercus velutina Lam.; Black Oak; 20 May 1893 (as *Q. coccinea tinctoria*) (MICH).

GENTIANACEAE (Gentian Family)

Bartonia virginica (L.) Britton, Stearns & Poggenb. (*Bartonia tenella* of Cole); Screw-stem; *Skeels & Shaddick* s.n., 27 Aug 1897 (MICH).

Frasera caroliniensis Walter; American Columbo; 24 Jun 1894 (MICH); *H. M. Bailey* s.n., 29 Jun 1891 (MICH).

Gentiana alba A. Gray; White Gentian, Yellowish Gentian; 10 Sep 1892, 6 Sep 1894 (MICH). **ENDANGERED.**

Gentiana andrewsii Griesb.; Closed Gentian, Bottled Gentian; *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Mulliken* s.n., 11 Sep 1891, 13 Sep 1897 (MICH); *Skeels* s.n., 4 Oct 1895 (MSC).

Gentianella quinquefolia (L.) Small (*Gentiana quinquefolia occidentialis* of Cole); Stiff Gentian; 20 Sep 1892, 21 Sep 1901 (MICH); 25 Sep 1893 (MO); *H. M. Bailey* s.n., 16 Sep 1893 (MICH); *M. B. Fallass* s.n., Sep 1897 (MICH); *B. E. Livingston* s.n., 12 Sep 1894 (MSC). **THREATENED.**

Gentianopsis crinita (Froel.) Ma (*Gentiana crinita* of Cole); Fringed Gentian; *B. E. Livingston* s.n., 12 Sep 1894 (MSC); *Sones* s.n., 16 Sep 1889 (MICH).

Gentianopsis virgata (Raf.) Holub. (*Gentiana serrata* of Cole; *Gentianopsis procera* of Voss); Small Fringed Gentian; 20 Sep 1893 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken* s.n., 11 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 6 Sep 1895 (MICH); *Skeels, Shaddick, Fyfe* s.n., 6 Oct 1895, 6 Oct 1895 (MICH, MSC).

GERANIACEAE (Geranium Family)

Erodium cicutarium (L.) L'Her.; Stork's-bill, Alfileria; 10 May 1898 (MICH); *Mulliken* s.n., 9 May 1896 (MICH); *Wheeler* s.n., 16 May 1895 (GH).

Geranium bicknellii Britton; Geranium; 10 Jun 1899 (MICH).

Geranium carolinianum L.; Geranium; 9 Jun 1900 (MICH).

Geranium maculatum L.; Wild Geranium; *H. M. Bailey* s.n., 23 May 1891 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MSC); *Sones* s.n., 12 May 1889 (MICH).

Geranium pusillum L.; Geranium; 10 Jun 1892, 20 Jun 1893 (MICH); *Mulliken* s.n., 22 May 1896 (MICH).

Geranium robertianum L.; Herb Robert; 8 Jul 1896, 20 Oct 1898 (MICH).

GROSSULARIACEAE (Currant or Gooseberry Family)

Ribes americanum Mill. (*Ribes floridum* of Cole); Wild Black Current; *Mulliken* s.n., 20 May 1897 (MICH); *Skeels & Shaddick* s.n., 19 May 1895, 13 Jul 1895 (MSC); *Sones* s.n., 14 May 1889 (MICH).

Ribes aureum Pursh; Golden Currant; Cole states, "Persistent near old gardens." No Cole specimen of this cultivated plant is known.

Ribes cynosbati L.; Wild Gooseberry, Prickly Gooseberry; 10 May 1893, 20 May 1896 (MICH); *H. M. Bailey* s.n., 7 May 1892 (MICH); *C. W. Fallass* s.n., 11 May 1894 (ALBC); *Skeels & Shaddick* s.n., 14 Jun 1895 (MSC).

Ribes hirtellum Michx. (*R. oxyacanthoides* of Cole); Swamp Gooseberry; 22 May 1896 (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC); *Shaddick* s.n., 12 May 1896; *Shaddick & Fyfe* s.n., 12 May 1896 (MSC).

Ribes odoratum H. L. Wendl. (*R. aureum* of Cole); Bufflao Current, Golden Current. Cole noted that the plant was persistent near old gardens.

Ribes rubrum L.; Red Currant; *H. M. Bailey* s.n., 7 May 1892 (MICH); *Mull[iken] and [L. J.] Cole* s.n., 22 May 1896 (MSC).

Ribes triste Pall. (*Ribes rubrum* of Cole); Swamp Red Currant; 5 May 1900 (MICH); *H. M. Bailey* s.n., 7 May 1892 (MICH); *Skeels & Shaddick* s.n., 9 May 1897 (as *R. rubrum*) (MSC).

HALORAGACEAE (Water-milfoil Family)

Myriophyllum heterophyllum Michx.; Variable Water-milfoil; 1 Aug 1897 (MSC, MICH); 11 Jun 1899 (MICH).

Myriophyllum sibiricum Komarov (*Myriophyllum spicatum* of Cole; *M. exalbescens* of Voss) Spiked Water-milfoil; 19 Jun 1896 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1896 (MSC). Cole identified her specimen as *Myriophyllum spicatum*, consistent with the prevailing viewpoint (Britton and Brown 1896-1898, Gray et al. 1890); the widespread plant native in North America so similar to *M. spicatum* was not recognized as distinct until Fernald (1919) described it as *M. exalbescens* (later to be recognized as conspecific with the earlier published *M. sibiricum*). The dreaded invasive European Water-milfoil (*M. spicatum*) was not documented from Michigan until 1970 (Voss and Reznicek, 2012).

Myriophyllum tenellum Bigelow; Water-milfoil; 29 Sep 1890 (MSC), 29 Sep 1890 (MSC); 1 Sep 1899 (fl., 9 Sep, fr., on same sheet) (MICH). Two populations, from Bostwick Lake and Little Bostwick Lake (across the road), are noted by Cole as "the first mention of its occurrence in State."

Myriophyllum verticillatum L.; Water-milfoil. Cole's specimen from the creek between Barber Lake and Toby Lake (now Blodgett Lake), Caledonia (1 Aug 1897 MICH), has been annotated as *M. heterophyllum*; *M. verticillatum* was later collected from Reeds Lake and by me from Lamberton Lake (both Cole collecting sites) and is therefore retained here.

Proserpinaca palustris L.; Mermaid-weed; 9 Oct 1897, 12 Oct 1897 (MICH).

HAMAMELIDACEAE (Witch Hazel Family)

Hamamelis virginiana L.; Witch Hazel; 22 Oct 1892 (MICH); 22 Oct 1892 (MSC); *H. M. Bailey* s.n., Nov 1891 (MICH); *L. J. Cole* s.n., 18 Jul 1896 (MSC); *Mulliken* s.n., 16 Nov 1895 (MICH); *Mulliken & E. J. Cole* s.n., 18 Jun 1896 (MICH); *Shaddick & Fyfe* s.n., 7 Jun 1896 (MSC).

HYPERICACEAE (St. John's-wort Family)

Hypericum ascyron L.; Giant St. John's-wort; 20 Jul 1893 (MICH); *H. M. Bailey* s.n., 26 Jul 1892 (MICH).

Hypericum kalmianum L.; Kalm's St. John's-wort; 14 Jul 1894 (MICH); *H. M. Bailey* s.n., 21 Jul 1892 (MICH); *Mulliken* s.n., 24 Jul 1895, 23 Jul 1897 (MICH); *Skeels* s.n., 13 Jul 1895 (MICH, MSC).

Hypericum majus (A. Gray) Britton (*Hypericum canadensis* and *H. canadensis majus* of Cole); Larger Canada St. John's-wort; 28 Jul 1893, 16 Sep 1898, 16 Sep 1898 (MICH);

- Mulliken* s.n., 11 Sep 1897 (ALBC), 11 Sep 1897, 11 Sep 1897, 11 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 17 Nov 1895 (MSC).
- Hypericum mutilum* L.; Weak St. John's-wort; 20 Jul 1893, 5 Sep 1893 (MICH); *H. M. Bailey* s.n., 13 Aug 1891 (MICH); *Mulliken* s.n., 17 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC).
- Hypericum perforatum* L.; Klamath Weed, Goat Weed, Common St. John's-wort; 1 Jul 1893, 10 Jul 1893 (MICH); *H. M. Bailey* s.n., 8 Jul 1892 (MICH); *Mulliken* s.n., 30 Jun 1896 (MICH); *Skeels* s.n. 21 Aug 1896 (MSC).
- Hypericum prolificum* L.; Shrubby St. John's-wort; 23 Jul 1893 (MICH); *H. M. Bailey* s.n., 3 Aug 1892 (MICH); *Matteson* s.n., 25 Jul 1894 (MSC).
- Hypericum punctatum* Lam. (*Hypericum maculatum* of Cole); Spotted St. John's-wort; 25 Jul 1893 (MICH); *Mulliken* s.n., 3 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC); *Skeels, Shaddick, B. E. Livingston, & Fyfe* s.n., 21 Jul 1895 (MSC).
- Triadenum fraseri* (Spach) Gleason (*Hypericum virginicum* of Cole); Marsh St. John's-wort; 10 Aug 1893, 20 Aug 1893 (both as *Elodes campanulata*) (MICH); *Mulliken* s.n., 10 Aug 1895 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (MSC).
- Triadenum virginicum* (L.) Raf. (*Hypericum virginicum* of Cole); Marsh St. John's-wort; *L. J. Cole* s.n., 10 Aug 1895 (as *Elodes campanulata*) (MSC).

JUGLANDACEAE (Hickory or Walnut Family)

- Carya cordiformis* (Wangenh.) K. Koch; (*Carya amara* of Cole) Bitternut Hickory; 2 May 1898 (MICH); *L. J. Cole* s.n., 10 May 1896 (MSC); *M. B. Fallass* s.n., May 1894 (ALBC); *Mulliken* s.n., 22 May 1897 (MICH).
- Carya glabra* (Mill.) Sweet (*Carya microcarpa* and *C. porcina* of Cole); Pignut Hickory; 10 May 1896, 27 Jul 1896 (as *C. porcina*), 21 Jul 1897 (as *C. microcarpa*), 28 Jul 1897 (as *C. porcina*), 29 Jul 1897 (MICH); 28 July 1897 (as *C. porcina*) (MSC); *C. W. Fallass* s.n., 17 May 1895 (ALBC); *Shaddick, Fyfe, Mulliken & E. J. Cole* s.n., 23 May 1897 (as *C. procina*) (MSC); *Skeels* s.n., 12 Oct 1895 (CU, MSC) *Skeels* s.n., 12 Oct 1895 (as *C. microcarpa*) (MICH).
- Carya ovata* (Mill.) K. Koch (*Carya alba* of Cole); Shagbark Hickory, Shellbark Hickory; 15 May 1895 (BH); 10 May 1896 (as *C. alba*), 27 Jul 1896 (as *C. porcina*), 27 Jul 1897 (as *C. provinciana*), 28 Jul 1897 (as *C. alba*) (MICH); *M. B. Fallass* s.n., 23 Jun 1897 (ALBC); *Mulliken* s.n., 22 May 1897, 22 May 1897 (MICH).
- Juglans cinerea* L.; Butternut; 10 May 1894 (MICH).
- Juglans nigra* L.; Black Walnut; 20 May 1898 (MICH); *M. B. Fallass* s.n., s.d. (ALBC).

LAMIACEAE (Mint Family)

- Agastache nepetoides* (L.) Kuntze (*Lophanthus neptoides* of Cole); Yellow Giant Hyssop; 25 Aug 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *M. B. Fallass* s.n., 30 Sep 1897; *Mulliken* s.n., 16 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC).
- Agastache scrophulariifolia* (Willd.) Kuntze (*Lophanthus scrophulariaefolium* of Cole); Purple Giant Hyssop; 29 Jul 1897, 27 Jul 1899, 29 Jul 1899 (MICH); 1 Aug 1897 (MSC).
- Blephilia ciliata* (L.) Benth.; Ohio Horse Mint; *H. M. Bailey* s.n., 27 Aug 1891, 4 Jul 1892 (MICH); *L. J. Cole* s.n., 20 Jun 1893 (MICH); *Mulliken* s.n., 4 Jul 1895 (MICH); *Shaddick* s.n., 18 Jun 1896 (MSC).
- Blephilia hirsuta* (Pursh) Benth.; Wood Mint; 24 Jul 1893 (MICH); *L. J. Cole* s.n., 23 Aug 1895 (MSC); *Skeels* s.n. 7 Aug 1896 (MSC).
- Clinopodium vulgare* L. (*Calamintha clinopodium* of Cole); Wild-basil, Dogmint; *H. M. Bailey* s.n., 1 Jul 1892 (MICH); *Mulliken* s.n., 27 Aug 1895, 28 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 6 Aug 1896 (MSC).
- Collinsonia canadensis* L.; Stoneroot; Richweed; Horse-balm; *Cole* s.d. (MICH).
- Glechoma hederacea* L.; Gill-over-the-ground, Ground-ivy, Creeping Charlie; *C. W. Fallass* s.n., 10 May 1894 (ALBC).
- Hedeoma hispida* Pursh; Rough Pennyroyal; *Skeels* s.n., 2 Aug 1896 (as *H. pulegioides*) (MSC); *Skeels & Shaddick* s.n., 2 Aug 1896 (as *H. pulegioides*) (MSC).
- Hedeoma pulegioides* (L.) Pers.; American Pennyroyal; 28 Aug 1896 (MICH); *Skeels* s.n., 12 Oct 1895 (MICH, MSC).
- Hyssopus officinalis* L.; Hyssop; *A. J. Pieters* s.n., Sep 1897 (MICH). *Cole* notes that this

- species of southern Europe is “[e]scaped from cultivation; rare.” Voss and Reznicek (2012) indicate that adventive collections in Michigan are sparse and that it has not been collected in the state since 1918.
- Leonurus cardiaca*** L.; Motherwort; 20 Jun 1893 (MICH); *Mulliken* s.n., 27 Jun 1896 (MICH); *Sones* s.n., 7 Aug 1889 (MICH).
- Lycopus americanus*** W. P. C. Barton (*Lycopus sinuatus* of Cole); Bugleweed, Water-horehound; *H. M. Bailey* s.n., 24 Jul 1891 (MICH); *Mulliken* s.n., 19 Aug 1897 (MICH); *Skeels* s.n., 19 Jul 1895 (MSC).
- Lycopus rubellus*** Moench; Stalked Water Horehound; 31 Jul 1893 (MICH).
- Lycopus uniflorus*** Michx. Northern Bugle Weed; 20 Aug 1893 (as *L. sinuatus*), 30 June 1898 (as *Lycopus virginicus*) (MICH); *H. M. Bailey* s.n., 15 Aug 1891, 12 Sep 1891 (MICH); *Sones* s.n., 10 Aug 1891 (MICH). Gray et al. (1890) included *L. uniflora* as a synonym under *L. virginicus*; specimens of Cole and her colleagues identified as *L. virginicus* have been annotated as *L. uniflorus*. No records of the State-Threatened *L. virginicus* are known from Kent or Ottawa Counties.
- Marrubium vulgare*** L.; Horehound; 10 Jun 1894 (MICH); *Skeels* s.n.; 15 Nov 1895 (MSC). Cole describes her collection as “escaped;” Voss and Reznicek (2012) indicate that this plant was early cultivated for use medicinally and in flavoring candies, beverages, and medicines, but that it has been collected only once since 1935.
- Mentha canadensis*** L. (*Mentha arvensis* of Voss); Wild Mint; 20 Aug 1893 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *M. B. Fallass* s.n., 20 Aug 1894 (MICH); *Mulliken* s.n., 10 Aug 1897 (MSC); *Skeels & Shaddick* s.n., 19 Jul 1895, 11 Aug 1896 (MSC); *Sones* s.n., 4 Aug 1889, 31 Aug 1889 (MICH).
- Mentha ×piperita*** L.; Peppermint; 8 Aug 1893 (MICH); 1 Sep 1890 (MICH); *H. M. Bailey* s.n., 15 Aug 1891 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).
- Mentha spicata*** L. (*Mentha viridis* of Cole); Spearmint; 12 Aug 1893 (MICH); *H. M. Bailey* s.n., 20 Aug 1892 (MICH); *B. E. Livingston* s.n., 2 Aug 1895 (MICH); *Mulliken* s.n., 15 Aug 1897, 27 Jul 1897 (MICH); *Skeels* s.n., 1 Aug 1895 (MSC).
- Mentha suaveolens*** Ehrh. (*Mentha rotundifolia* of Cole); Apple Mint, Pineapple Mint; 8 Oct 1899 (MICH); 1899 (MSC).
- Monarda didyma*** L.; Bee-balm, Oswego-tea. Cole notes that C. W. Fallass collected a few plants from a small patch in moist shaded soil along a road in Byron Twp. 3 Jul 1893, but no herbarium specimen is known. Voss and Reznicek (2012) say that such occurrences are clear escapes from cultivation.
- Monarda fistulosa*** L.; Wild Bergamot; 23 Jul 1893, 30 Jul 1897 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken* s.n., 16 Jul 1895, 27 Jun 1896 (MICH); *Sones* s.n., 14 Jul 1890 (MICH).
- Monarda punctata*** L.; Horse Mint, Dotted Mint; 9 Aug 1894 (MICH); *Luther S. Livingston* s.n., 18 Jul 1895 (MICH); *Skeels* s.n., 20 Sep 1895 (MSC); *Skeels & Shaddick* s.n., 16 Aug 1896 (ALBC), *Skeels & Shaddick* s.n., s.d. (MICH).
- Nepeta cataria*** L.; Catnip, Catmint; 10 Jul 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Mulliken* s.n., 6 Jul 1895 (MICH).
- Physostegia virginiana*** (L.) Benth.; False Dragonhead, Obedient Plant; *L. J. Cole* s.n. Aug 1895, Aug 1895 (as *P. parviflora*) (MSC); *B. E. Livingston* s.n., 25 Aug 1894 (MICH); *Mulliken* s.n., 16 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH), 26 Aug 1896 (MSC).
- Prunella vulgaris*** L.; Self-heal, Heal-all; 27 Jun 1893 (MICH); *Mulliken* s.n., 12 Jul 1897 (MICH); *Skeels* s.n., 17 Jul 1895 (as *Brunella vulgaris*) (MSC).
- Pycnanthemum virginianum*** (L.) Durand & Jackson (*Pycnanthemum lanceolatum* of Cole); Common Mountain Mint; 24 Jul 1893, 3 Aug 1897 (MICH); *H. M. Bailey* s.n., 29 Jul 1891 (MICH); *Mulliken* s.n., 24 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC); *Sones* s.n., s.d. (MICH).
- Salvia azurea*** Lam. (*Salvia azurea grandiflora* of Cole); Blue Sage; 12 Sep 1893 (MICH, MSC). Cole’s collection from along Godfrey Ave. near the railroad track within the City represented the first collection in Michigan; this species is apparently adventive from the Southwest. Since she reported “two clumps,” one wonders if her two specimens also represented an eradication of this adventive; the only other documentation for Michigan was

a 1936 specimen from Kalamazoo Co. along a railroad track connecting Kalamazoo with Grand Rapids (MICHIGAN FLORA ONLINE 2011).

Scutellaria galericulata L.; Marsh Skullcap; 13 Aug 1893 (MICH); *H. M. Bailey* s.n., 28 Aug 1891, 8 Jul 1892 (MICH); *Mulliken* s.n., 25 Jun 1895 (MICH); *Sones* s.n., 10 Aug 1891 (MICH).

Scutellaria lateriflora L.; Mad-dog Skullcap; 31 Jul 1893, 20 Aug 1893 (MICH); *H. M. Bailey* s.n., 30 Jul 1891 (MICH); *L. J. Cole* s.n., Aug 1895 (MSC); *Mulliken* s.n., 19 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC); *Sones* s.n., 13 Aug 1891 (MICH).

Stachys hispida Pursh (*Stachys palustris* of Cole); Hedge Nettle; *Mulliken* s.n., 5 Aug 1897 (MICH); *Skeels*, s.n. 19 Jul 1895 (MSC); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC); *Sones* s.n., 12 Jul 1889 (MICH).

Stachys hyssopifolia Michx.; Hyssop Hedge Nettle; 17 Jul 1899, 1 Sep 1899 (MICH).

Stachys tenuifolia Willd. (*Stachys aspera glabra* of Cole); Smooth Hedge Nettle; 14 Jul 1896 (MICH); *B. E. Livingston* s.n., 19 Aug 1892 (MICH); *Skeels* s.n., 19 Jul 1895 (MSC); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).

Teucrium canadense L.; Wood-sage; 27 Jul 1893 (MICH); *H. M. Bailey* s.n., 24 Jul 1891 (MICH); *Mulliken* s.n., 4 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC); *Sones* s.n., 30 Jul 1889 (MICH).

LAURACEAE (Laurel Family)

Lindera benzoin (L.) Blume; Spicebush; 1 May 1894 (MICH); *H. M. Bailey* s.n., 16 Apr 1892 (MICH); *M. B. Fallass* s.n., Apr 1894 (ALBC); *Skeels & Shaddick* s.n., 24 Apr 1898 (as *Benzoin benzoin*) (MSC); *Sones* s.n., 26 Apr 1889 (MICH).

Sassafras albidum (Nutt.) Nees (*Sassafras officinale* of Cole); Sassafras; 2 May 1893 (MICH); *H. M. Bailey* s.n., 2 Jun 1893 (MICH); *C. W. Fallass* s.n., 6 May 1894 (ALBC); *Skeels & Shaddick* s.n., 12 May 1895, 16 Sep 1896 (MSC); *Skeels* s.n., 6 Sep 1895 (MSC).

LENTIBULARIACEAE (Bladderwort Family)

Utricularia cornuta Michx.; Horned Bladderwort; 20 Jun 1895 (MICH); *H. M. Bailey* s.n., 25 Jun 1893 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MICH).

Utricularia gibba L.; Humped Bladderwort; 3 Sep 1899 (MICH); 11 Sep 1897 (MICH); *Mulliken* s.n., 11 Sep 1897 (ALBC).

Utricularia intermedia Hayne; Flat-leaved Bladderwort; 3 Sep 1899 (MICH); *S. O. Livingston* s.n., 4 June 1899 (MICH); *Mulliken* s.n., 19 Sep 1895, 11 Sep 1897 (MICH).

Utricularia minor L.; Small Bladderwort; *S. O. Livingston* s.n., 10 Jun 1896 (MICH).

Utricularia resupinata B. D. Greene; Small Purple Bladderwort; 1 Sep 1899 (MICH).

Utricularia vulgaris L.; Common Bladderwort; 25 Jun 1895 (MICH).

LINACEAE (Flax Family)

Linum striatum Walter; Stiff Yellow Flax; 8 Sep 1899, 8 Sep 1899 (MICH).

Linum sulcatum Riddell; Grooved Yellow Flax; 24 Jul 1896 (MICH); *Hyser* s.n., 1898 (MICH). Cole notes that this plant was "plentiful" at the Plainfield Village gravel pit, which, at that time, was the only known site in Michigan. Currently the area is a huge commercial gravel operation. **SPECIAL CONCERN.**

Linum usitatissimum L.; Common Flax; *Skeels* s.n., 25 Aug 1895 (MICH). This commonly cultivated species was spontaneous in several disturbed areas around the City and along railroad tracks.

Linum virginianum L.; Slender Yellow Flax; 25 Jul 1893, 16 Sep 1899 (MICH); *M. B. Fallass* s.n., 1899 (ALBC). **THREATENED.**

LINDERNIACEAE (False Pimpernel Family)

Lindernia dubia (L.) Pennell (*Ilysanthes riparia* of Cole); False Pimpernel; 1 Sep 1899 (MICH).

LINNAEACEAE (Twinflower Family)

Linnaea borealis L.; Twinflower; 5 Jul 1899 (MICH).

LYTHRACEAE (Loosestrife Family)

Decodon verticillatus L.; Swamp Loosestrife; *H. M. Bailey* s.n., 28 Aug 1891 (MICH); *B. E. Livingston* s.n., 12 Aug 1894 (MSC); *Mulliken* s.n., 20 Jul 1895, 10 Aug 1895 (MICH); *Skeels & Shaddick* s.n., 4 Aug 1896, 4 Aug 1896 (MSC).

MAGNOLIACEAE (Magnolia Family)

Liriodendron tulipifera L.; Tulip Tree; *Skeels* s.n., 12 Oct 1895 (ALBC, MSC). Cole mentions that this species is one of the southern plants that reaches its northern limit along the Grand River Valley. She also specifically mentions it occurring in the Mill Creek woods, which *Skeels* and *Shaddick* thoroughly studied. During our inventory of that locality in 2016 for our project we rediscovered Tulip Trees so large that we believe they were growing at the site when *Skeels* and *Shaddick* botanized there: *Alan Stockdale, Lydia Abma, & Garrett Crow 1078* (CALVIN, MICH, MSC).

MALVACEAE (Mallow Family)

Abutilon theophrasti Medik. (*Abutilon avicennae* of Cole); Velvet-leaf; 6 Sep 1896 (MICH); *Skeels & Fyfe* s.n., 13 Oct 1895 (MSC); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC).

Alcea rosea L. (*Althaea rosea* of Cole); Hollyhock. Cole notes that this cultivar escapes and persists in many places, but no specimens document the species for Kent County.

Hibiscus moscheutos L.; Swamp Mallow, Rose Mallow; Aug 1898 (MICH); *H. M. Bailey* s.n., 3 Aug 1893 (MICH); *Skeels* s.n., 26 Jul 1895, 4 Oct 1895 (MSC). Cole notes that “in 1885 or ’86 there were hundreds of plants in the marsh about the Salt Spring...only six clumps of plants remaining in 1900.” The Salt Spring has since disappeared—it is a residential area now. *Skeels*’ specimen labels say “Division St. at Silver Creek.” Silver Creek now flows through downtown in a subterranean storm drain. This species had not been rediscovered for the area of Cole’s *Flora* until 9 Aug 2017, when it was found growing along the Grand River at Grand Ravines Park, Ottawa County: *Van Donselaar & Antuma 2768* (CALVIN). Within a few days of its discovery, the small population had been destroyed by workers installing a boat launch for the Park (*Antuma* pers. comm. 2017).

Hibiscus trionum L.; Flower-of-an-hour; 31 Oct 1899 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MICH).

Malva moschata L.; Musk Mallow; 24 Jun 1898, 1 Sep 1899 (MICH); 18 Jun 1895 (MICH); *H. M. Bailey* s.n., 27 Jul 1892 (MICH); *Sones* s.n., 19 Jul 1892, 20 Aug 1892 (MICH).

Malva neglecta Wallr. (*Malva rotundifolia* of Cole); Common Mallow; 8 Jul 1893 (MICH); *Mulliken* s.n., 24 Jun 1896 (MICH); *Sones* s.n., 29 Jul 1892 (MICH).

Tilia americana L.; Basswood, Linden; 10 Aug 1895 (MICH); *H. M. Bailey* s.n., 15 Jul 1892 (MICH).

MENISPERMACEAE (Moonseed Family)

Menispermum canadense L.; Moonseed; 7 Jul 1897, Lowell, ca. 3 miles east of the *Flora* area (MICH); *Skeels* s.n., 7 Aug 1896, 7 Aug 1896 (MICH, MSC).

MENYANTHACEAE (Buckbean Family)

Menyanthes trifoliata L.; Bog Buckbean, Bogbean; *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken & L. J. Cole* s.n., 9 May 1896 (MICH); *Shaddick & Fyfe* s.n., 8 May 1895 (MSC); *Skeels* s.n., 8 May 1895 (MICH).

MOLLUGINACEAE (Carpetweed Family)

Mollugo verticillata L.; Carpet-weed; 23 Aug 1893 (MICH); *Mulliken* s.n., 27 Jun 1897 (MICH); *Skeels & Shaddick* s.n., 26 Aug 1896 (MSC); *Sones* s.n., 18 Jul 1889 (MICH).

MONTIACEAE (Spring-beauty or Blinks Family)

Claytonia virginica L.; Spring-beauty; 23 Apr 1893 (MICH); *H. M. Bailey* s.n., 26 Apr 1891, 30 Apr 1892 (MICH); *Mulliken* s.n., 17 Apr 1896 (MICH); *Sones* s.n., 20 Apr 1889 (MICH).

MORACEAE (Mulberry Family)

Maclura pomifera (Raf.) C. K. Schneid. (*Maclura aurantiaca* of Cole); Osage-orange; 20 Oct 1895 (MICH). Cole notes that this species is “scarcely naturalized,” not escaping very far from planted windbreaks.

Morus rubra L.; Red Mulberry; Jul 1896, Jul 1896 (MICH). Cole notes that this rare plant occurs only occasionally, in alluvial soil; both collections are from along the Grand River, in Jenison (Ottawa Co.) and in Plainfield (Kent Co.) **THREATENED**.

MYRICACEAE (Bayberry Family)

Comptonia peregrina (L.) J. M. Coult. (*Myrica asplenifolia* of Cole); Sweetfern; 1 Jun 1896 (MICH); *L. J. Cole* s.n., 15 May 1895 (MICH, MSC).

MYRSINACEAE (Myrsine Family)

Lysimachia ciliata L. (*Sterionema ciliatum* of Cole); Fringed Loosestrife; 7 Jul 1893 (MICH); *H. M. Bailey* s.n., 9 Jul 1891 (MICH); *Mulliken* s.n., 22 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (MSC) *Sones* s.n., 9 Jul 1890 (MICH).

Lysimachia lanceolata Walter (*Sterionema lanceolatum* of Cole); Lance-leaved Loosestrife; 8 Jul 1893 (MICH); *H. M. Bailey* s.n., 29 Jun 1891 (MICH); *Mulliken* s.n., 27 Jun 1896 (MICH).

Lysimachia nummularia L.; Moneywort; 20 Jul 1898 (ALBC); 11 Jun 1898 (MICH); *Mulliken* s.n., 16 Aug 1897 (MICH); *Skeels & Shaddick* s.n. 25 Aug 1895 (MICH, MSC), 26 Aug 1896 (MSC).

Lysimachia quadriflora Sims (*Sterionema longifolium* of Cole); Whorled Loosestrife; 1 Sep 1893, 14 Jul 1897 (MICH); *H. M. Bailey* s.n., 30 Jul 1891, 1 Jul 1892 (MICH); *Sones* s.n., 14 Jul 1890 (MICH).

Lysimachia quadrifolia L.; Whorled Loosestrife, Four-leaved Loosestrife; 1 Aug 1893 (MICH).

Lysimachia terrestris (L.) Britton, Sterns & Poggenb. (*Lysimachia stricta* of Cole); Swamp-candles; 1 Jul 1893, 24 Sep 1898 (MICH); 24 Sep 1898 (MSC); 25 Jul 1895 (MICH); *H. M. Bailey* s.n., 12 Jul 1892 (MICH); *L. J. Cole* s.n., 4 Jul 1896 (MSC).

Lysimachia thyrsoflora L.; Tufted Loosestrife; *L. J. Cole* s.n., 18 Jun 1893 (MICH).

Trientalis borealis Raf. (*Trientalis americana* of Cole); Star-flower; *H. M. Bailey* s.n., 23 May 1891 (MICH); *Skeels* s.n., 19 May 1895 (MSC).

NYCTAGINACEAE (Four-o'clock Family)

Mirabilis albida (Walter) Heimerl (*Oxybaphus hirsutus* of Cole; *Mirabilis hirsuta* of Voss); Pale Umbrellawort; *C. W. Fallass* s.n., 30 Jun 1895 (ALBC); *M. B. Fallass* s.n., 20 Jun 1895, 28 Aug 1895 (MICH); *Mulliken* s.n., 18 Sep 1897, 18 Sep 1897 (MICH). Cole cites this species from "...along the D. G. H. & M. Ry. embankments, west from the Junction (W. M. Clark), 1893. Still spreading. Introduced from the West." Voss and Reznicek (2012) indicate that the first record for Michigan is from Kent County in 1895; it appears to travel "by rail."

NYMPHAEACEAE (Water-lily Family)

Nuphar advena R. Br.; Yellow Pond-lily, Yellow Water-lily, Spadder-dock; 12 Jun 1894 (MICH); *H. M. Bailey* s.n., 11 Jun 1892 (MICH); *Sones* s.n., 18 Jul 1890 (MICH).

Nymphaea odorata Aiton; White Water-lily; Sweet-scented Water-lily; 14 Jun 1876 (MICH); *Shaddick* s.n., 2 July 1895 (MSC). Cole cites Crooked Lake (now Dean Lake) as the only locality in the Flora region; it tends to be a more northern, often softwater species.

Nymphaea tuberosa Paine; Tuber-bearing Water-lily; 18 Jul 1898 (MICH); *H. M. Bailey* s.n., 19 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1896 (MSC) (all as *N. reniformis*). Contrary to Voss and Reznicek (2012), I regard this and *N. odorata* as distinct species. Cole treated them separately as well, this being the more common species here.

NYSSACEAE (Tupelo Family)

Nyssa sylvatica Marshall; Sour-gum, Black-gum, Pepperidge, Tupelo; 9 Jun 1897 (MICH).

OLEACEAE (Olive Family)

Fraxinus americana L.; White Ash; *H. M. Bailey* s.n., 9 Jul 1892 (MICH).

Fraxinus nigra Marshall (*Fraxinus sambucifolia* of Cole); Black Ash; 10 May 1894, 30 May 1895 (MICH).

Fraxinus pennsylvanica Marshall (including *Fraxinus viridis* of Cole); Green Ash, Red Ash; 2 Jul 1902 (as *F. viridis*) (MICH); *Skeels* s.n., 26 Aug 1896 (as *F. viridis*), 20 Sep 1895 (as *F. pubescens*) (MICH, MSC); *Skeels & Shaddick* s.n., 26 Aug 1896 (as *F. viridis*) (MICH, MSC).

Fraxinus quadrangulata Michx.; Blue Ash. Cole noted that there are no specimens documenting the species, but that it was "[r]eported as occasional along the bluffs of Grand River by several lumbermen who were interested in timber in 'early times.'" Reznicek (pers. comm. 2017) pointed out that there is a single specimen documenting the species for

Kent County, a recent (1989) collection from Cascade Twp. in a ravine ca. 1 mile west of the Thorneapple River, just ca. 7 miles south of its emptying into the Grand River.

Syringa vulgaris L.; Common Lilac. Cole notes that this plant persists around dwelling sites and waysides, implying that they were planted rather than escaping; no voucher has been located.

ONAGRACEAE (Evening-primrose Family)

Chamaenerion angustifolium (L.) Holub; Fireweed (*Epilobium angustifolium* of Cole and of Voss); 25 Jul 1893 (MICH); *H. M. Bailey* s.n., 11 Jul 1891 (MICH); *Mulliken* s.n., 21 Aug 1892, 10 Aug 1895 (MICH); *Skeels & Shaddick* s.n., 14 Jul 1895 (MICH).

Circaea alpina L.; Small Enchanter's-nightshade; 28 Jul 1893 (MICH); 22 Jun 1895 (MICH); *H. M. Bailey* s.n., 11 Jul 1891 (MICH).

Circaea canadensis (L.) Hill (*Circaea lutetiana* of Cole and of Voss); Enchanter's-nightshade; 28 Jul 1893 (MICH); *H. M. Bailey* s.n., 6 Jul 1892 (MICH); *Mulliken* s.n., 4 Jul 1895 (MICH).

Epilobium ciliatum Raf. (*Epilobium adenocaulon* of Cole); Herb-willow; 25 Jul 1874, 20 Aug 1893 (MICH); 4 Jul 1895 (MICH); 11 Jul 1892 (MICH).

Epilobium coloratum Biehler (*Epilobium lineare* of Cole); Cinnamon Willow-herb; *Mulliken* s.n., 4 Aug 1896 (ALBC); 27 Jul 1895 (MICH).

Epilobium leptophyllum Raf. (*Epilobium lineare* of Cole); Fen Herb-willow; 12 Aug 1896, 1 Sep 1896, 16 Jul 1892, 3 Aug 1899, 12 Aug 1899 (as *E. palustre*) (MICH); *Skeels & Shaddick* s.n., 2 Aug 1896 (ALBC).

Epilobium strictum Spreng.; Downy Herb-willow; 1 Sep 1896, 20 Jul 1898, 12 Aug 1899 (as *E. palustre*) (MICH); *Mulliken* s.n., 27 Jul 1895 (MICH).

Ludwigia palustris (L.) Elliott; Water-purslane; 6 Aug 1895 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC); *Skeels, Shaddick, B. E. Livingston & Fyfe* s.n., 21 Jul 1895 (MSC).

Oenothera biennis L.; Common Evening-primrose; *Skeels* s.n. 13 Sep 1895 (MSC).

Oenothera fruticosa L.; Sundrops; 6 Jul 1893 (MICH); 30 Jun 1894 (MO); *H. M. Bailey* s.n., 12 Jul 1892, 18 Jul 1893 (MICH); *Mulliken* s.n., 27 Jun 1896 (MICH); *Sones* s.n., s.d. (MICH).

Oenothera gaura W. L. Wagner & Hoch (*Gaura biennis* of Cole and of Voss); Biennial Gaura; *Skeels* s.n., 6 Oct 1895 (MICH, MSC), 6 Oct 1895, 6 Oct 1895 (MSC).

Oenothera perennis L. (*Oenothera pumila* of Cole); Small Sundrops; 26 Jul 1897 (MICH); *H. M. Bailey* s.n., 1 Jul 1891, 2 Jul 1892 (MICH).

Oenothera villosa Thunb.; Evening-primrose; 8 Aug 1893 (as *O. biennis*) (MICH).

OROBANCHACEAE (Broom-rape Family)

Agalinis purpurea (L.) Pennell (*Gerardia purpurea* and *G. purpurea paupercula* of Cole); Purple False Foxglove; 4 Sep 1899 (MICH); *H. M. Bailey* s.n., 15 Sep 1893 (MICH); *Skeels & Shaddick* s.n., 21 Aug 1896 (MSC).

Aureolaria flava (L.) Farw. (*Gerardia flava* of Cole); Smooth False Foxglove; 10 Aug 1893, 10 Aug 1893 (both as *Gerardia quercifolia*) (MICH); *Mulliken* s.n., 23 Aug 1897 (ALBC); 4 Aug 1896 (MICH); *Skeels* s.n., 13 Sep 1895 (MSC).

Aureolaria pedicularia (L.) Raf. (*Gerardia pedicularia* of Cole); Annual False Foxglove; 23 Aug 1893 (MICH); *Mulliken* s.n., 4 Aug 1896 (MICH), 23 Aug 1897 (ALBC, MICH); *Sones* s.n., 8 Aug 1891 (MICH).

Aureolaria virginica (L.) Pennell (*Gerardia quercifolia* of Cole); Downy False Foxglove; 25 Jul 1893 (as *Gerardia flava*), 10 Aug 1893; *H. M. Bailey* s.n., 18 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 21 Jul 1895 (MSC).

Castilleja coccinea (L.) Spreng.; Indian Paintbrush; 19 May 1893 (MICH); *B. E. Livingston* s.n., Jun 1891 (MICH); *Mulliken* s.n., 22 Jun 1895 (MICH); *Skeels* s.n., 8 May 1895 (MSC); *Sones* s.n., 10 May 1889 (MICH).

Conopholis americana (L.) Wallr.; Squaw-root, Cancer-root; *Mulliken* s.n., 28 May 1897; *Skeels, Shaddick, Fyfe & B. E. Livingston* s.n., 21 Jul 1895 (MSC).

Epifagus virginiana (L.) W. P. C. Barton (*Epiphegus* [sic] *virginiana* of Cole); Beech-drops; 3 Aug 1893 (MICH); *B. E. Livingston* s.n., 10 Sep 1892 (MICH); *Skeels* s.n., 20 Sep 1892 (MICH).

Melampyrum lineare Desr. (*Melampyrum americanum* of Cole); Cow-wheat; 28 Jun 1893, 3

Aug 1893 (MICH); *H. M. Bailey* s.n., 3 Jul 1891 (MICH); *Mulliken* s.n., 12 Jul 1897 (MICH).

Orobanche uniflora L. (*Aphyllon uniflorum* of Cole); One-flowered Cancer-root; *Mulliken* s.n., 20 May 1897 (MICH, MSC).

Pedicularis canadensis L.; Wood-betony, Canadian Lousewort; 10 May 1893 (MICH); *H. M. Bailey* s.n., 9 May 1891 (MICH); *Mulliken* s.n., 23 May 1895 (MICH); *Sones* s.n., 8 May 1889 (MICH).

Pedicularis lanceolata Michx.; Swamp-betony, Swamp Lousewort; 23 Aug 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Mulliken* s.n., 9 Sep 1895 (MICH).

OXALIDACEAE (Oxalis or Wood-sorrel Family)

Oxalis dillenii Jacq. (*Oxalis cymosa* of Cole; *O. stricta* of Voss); Oxalis; 30 Jun 1893 (as *O. corniculata stricta*), 1 Sep 1899, 10 Sep 1899 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Oxalis stricta L. (*Oxalis fontana* of Voss); Oxalis; 20 Jun 1893 (MICH); *H. M. Bailey* s.n., 28 Jun 1892 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).

PAPAVERACEAE (Poppy Family)

Adlumia fungosa (Aiton) Britton, Stearns & Poggenb. (*Adlumia cirrhosa* of Cole); Climbing Fumitory, Allegheny Vine; *Sones* s.n., 19 Jul 1889 (MICH). Cole stated: "Reported from Grand Rapids previous to 1880 (Miss Mary H. Clark). In the U. of M. Herbarium." Unfortunately that collection has not persisted at MICH. However, a collection by George D. Sones from Ross near the railroad depot at 100th St. in Byron Twp., documents the plant.

SPECIAL CONCERN.

Capnoides sempervirens (L.) Borkh. (*Corydalis glauca* of Cole; *Corydalis sempervirens* of Voss); Pale Corydalis, Rock Harlequin, Pink Corydalis; *L. J. Cole* s.n., 20 Jun 1897 [1877] (MICH); *H. N. & L. J. Cole* s.n., 20 June 1897 (MSC).

Chelidonium majus L.; Celandine; 12 Jun 1897 (MICH); *Sones* s.n., 20 Jun 1890 (MICH). Voss and Reznicek (2012) note that Cole's specimen is the first record for Michigan of this Eurasian weed, but Sones' specimen is earlier; Cole says that the plant has been "spontaneous for fifteen years" at Lyon St. in the City.

Dicentra canadensis (Goldie) Walp.; Squirrel-corn; 2 May 1896 (MICH); *H. M. Bailey* s.n., 30 Apr 1892 (MICH).

Dicentra cucullaria (L.) Bernh.; Dutchman's-breeches; 15 May 1893 (MICH); *H. M. Bailey* s.n., 30 Apr 1892 (MICH). *Shaddick & Fyfe* s.n., 10 May 1895 (MSC); *Sones* s.n., 20 Apr 1889 (MICH).

Papaver rhoeas L.; Field Poppy, Corn Poppy. Cole states that this plant "[p]ersists from self-sown seeds for a few seasons in or near gardens." No Cole specimen exists, and the species is not documented for Kent County in Voss and Reznicek (2012).

Sanguinaria canadensis L.; Bloodroot; 10 Apr 1893 (MICH); 15 Apr 1892 (MICH).

Stylophorum diphyllum (Michx.) Nutt.; Celandine Poppy; 25 May 1893 (MICH); *H. M. Bailey* s.n., 23 May 1891 (MICH); *Sones* s.n., 6 May 1889 (MICH).

PARNASSIACEAE (Grass-of-Parnassus Family)

Parnassia glauca Raf. (*Parnassia caroliniana* of Cole); Grass-of-Parnassus; 1 Aug 1893 (MICH); *Mulliken* s.n., 9 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 21 Jul 1895 (CU).

PENTHORACEAE (Ditch Stonecrop Family)

Penthorum sedoides L.; Ditch Stonecrop; 26 Jul 1893 (MICH); *H. M. Bailey* s.n., 6 Aug 1892 (MICH); *Mulliken* s.n., 27 Aug 1895 (MICH).

PHRYMACEAE (Lopseed Family)

Mimulus ringens L.; Monkey-flower; 30 Jul 1898 (MICH); 15 Aug 1891 (MICH).

Phryma leptostachya L.; Lopseed; 25 Jul 1893 (MICH); *H. M. Bailey* s.n., 20 Jul 1893 (MICH); *M. B. Fallass* s.n., 30 Sep 1897 (MICH).

PHYTOLACCACEAE (Pokeweed Family)

Phytolacca americana L.; Poke, Pokeweed (*Phytolacca decandra* of Cole); 1 Oct 1893 (MICH); *Mulliken* s.n., 6 Jul 1895, 6 Jul 1895 (MICH); *Sones* s.n., 2 Jul 1890 (MICH).

PLANTAGINACEAE (Plantain Family)

- Besseya bullii* (Eaton) Rydb.; Kitten-tail (*Synthyris houghtoniana* of Cole); 1 Jun 1894 (MICH). Localities noted have been much impacted by residential development. **ENDANGERED.**
- Chelone glabra* L.; Turtlehead; 20 Aug 1893 (MICH); *H. M. Bailey* s.n., 28 Aug 1891 (MICH).
- Collinsia verna* Nutt.; Blue-eyed-Mary; *H. M. Bailey* s.n., 2 May 1891 (MICH); *M. B. Fallass* s.n., 10 May 1897 (MICH); *Sones* s.n., 17 May 1890. Cole says that this “beautiful spring annual with blue and white party-colored [sic] flowers occurring in rich moist woodlands” is “abundant and local,” but Voss and Reznicek (2012) note that there are but few recent collections post-1980. **SPECIAL CONCERN.**
- Linaria vulgaris* Mill.; Butter-and-eggs; 28 Aug 1893 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken* s.n., 28 Jul 1895 (MICH).
- Nuttallanthus canadensis* (L.) A. A. Sutton (*Linaria canadensis* of Cole and of Voss); Blue Toadflax; 18 May 1899 (MICH); *H. M. Bailey* s.n., 7 Jun 1892 (MICH); *C. W. Fallass* s.n., 12 May 1894 (ALBC); *Sones* s.n., 9 Jun 1889 (MICH).
- Penstemon calycosus* Small (*Penstemon laevigatus* of Cole); Smooth Beard-tongue; *H. M. Bailey* s.n., 10 Jul 1896 (MICH, MSC). Cole notes that: “[a] few plants were found in a field south of Reed’s Lake, July 1894 (Mrs. Hattie M. Bailey Pieters).” This area has been greatly altered and is now mostly residential or occupied by the campus of Calvin College. **THREATENED.**
- Penstemon digitalis* Nutt. (*Penstemon laevigatus* and *P. laevigatus digitalis* of Cole); Fox-glove Beard-tongue; *Mulliken* s.n., 20 Jun 1899 (MICH).
- Penstemon hirsutus* (L.) Willd. (*Penstemon pubescens* of Cole); Hairy Beard-tongue; *H. M. Bailey* s.n., 29 Jun 1891 (MICH); *L. J. Cole* s.n., 18 Jun 1893 (MICH); *Mulliken* s.n., 27 Jul 1897 (MICH); *Shaddick* s.n., 18 Jun 1896 (MSC); *Shaddick & Fyfe* s.n., 24 May 1894; *Skeels* s.n., 31 Jan 1895, fruit (MSC); *Sones* s.n., 8 Jun 1889 (MICH).
- Penstemon pallidus* Small; Pale Beard-tongue; *Mulliken* s.n., 4 Jun 1895 (as *P. pubescens*) (MSC). **SPECIAL CONCERN.**
- Plantago aristata* Michx.; Bracted Plantain; 10 Jun 1900 (MICH); *Mulliken* s.n., 3 Aug 1897 (MICH). This prairie plant native to the central plains is regarded as adventive in Michigan, and is now widespread in the U. S.
- Plantago lanceolata* L.; Ribgrass, Buckhorn, Narrow-leaved Plantain, English Plantain; 20 Jun 1893 (MICH); *Mulliken* s.n., 10 Jun 1895 (MICH).
- Plantago major* L.; Common Plantain; 1 Jul 1898, 1 Sep 1899 (as *P. rugelii*) (MICH); *H. M. Bailey* s.n., 26 Aug 1892 (MICH); *Mulliken* s.n., 10 Aug 1895 (MICH).
- Plantago rugelii* Decne.; Rugel’s Plantain; Red-stalked Plantain; 25 Jul 1893 (MICH); *M. B. Fallass* s.n., 12 Aug 1893 (MICH); *Mulliken* s.n., 13 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 26 Aug 1896 (MSC). Voss and Reznicek (2012) indicate that this native species was first documented for Michigan in Kent Co. in 1893.
- Veronica anagallis-aquatica* L. (*Veronica anagallis* of Cole); Water Speedwell; 6 Jun 1897, 24 Aug 1899 (MICH); *Skeels* s.n., 19 Jul 1895 (MSC); *Sones* s.n., 14 Jun 1890 (MICH).
- Veronica arvensis* L.; Field Speedwell, Corn Speedwell; 1 Jun 1894 (MICH).
- Veronica anstriaca* L. (*Veronica latifolia* of Cole); Speedwell; *M. B. Fallass* s.n., 1898 (ALBC); *Mulliken* s.n., 30 May 1895 (MICH). Cole says that, according to S. Owen Livingston, it escapes from cultivation and was plentiful at the corner of Peach Ave. and Alpine Gravel Road; Voss and Reznicek (2012) note that the first collection for Michigan was made in 1895 in Kent Co.
- Veronica beccabunga* Raf. (*Veronica americana* of Cole); Brooklime; 10 Jun 1893 (MICH); *H. M. Bailey* s.n., 7 Jul 1893 (MICH); *Mulliken* s.n., 27 Jun 1895 (MICH).
- Veronica peregrina* L.; Neckweed, Purslane Speedwell; 26 Jun 1894 (MICH); *C. W. Fallass* s.n., 10 May 1894 (ALBC); *M. B. Fallass* s.n., Jun 1899 (ALBC); *Mulliken* s.n., 12 Jul 1897 (MICH).
- Veronica scutellata* L.; Marsh Speedwell; *H. M. Bailey* s.n., 9 Jun 1892 (MICH). Cole states (under *V. serpyllifolia*): “*V. scutellata* L. may be looked for in swamps.” But apparently she did not find it herself and did not list it in her *Flora*, in spite of a specimen in the personal herbarium of Hattie Bailey Pieters, which Cole had consulted.

Veronica serpyllifolia L.; Thyme-leaved Speedwell; 15 May 1893 (MICH); 9 Jun 1892 (MICH).

Veronicastrum virginicum (L.) Farw. (*Veronica virginica* L. of Cole); Culver's-Root; 20 Jul 1893 (MICH); *H. M. Bailey* s.n., 30 Jun 1891 (MICH); *Mulliken* s.n., 1 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC).

PLATANACEAE (Plane-tree Family)

Platanus occidentalis L.; Sycamore; *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken & E. J. Cole* s.n., 2 May 1896 (MICH).

POLEMONIACEAE (Phlox Family)

Phlox divaricata L.; Wild Blue Phlox; 3 May 1893 (MICH); *H. M. Bailey* s.n., 2 May 1892 (MICH); *Matteson* s.n., 18 May 1894; *Mulliken* s.n., 2 May 1896, 12 May 1897 (MICH); *Shaddick & Fyfe* s.n., 25 1895, (MSC).

Phlox pilosa L.; Prairie Phlox; 1 Jun 1899 (MICH); *H. M. Bailey* s.n., May 1891 (MICH); *L. J. Cole* s.n., 18 Jun 1893 (MICH); *Matteson* s.n., 18 May 1894 (MSC); *Mulliken* s.n., 31 May 1897 (MICH, MSC); *Shaddick & Fyfe* s.n., 25 May 1895 (MSC).

Phlox subulata L.; Moss-pink, Moss Phlox; *L. J. Cole* s.n., 9 May 1896 (MSC); *C. W. Fallass* s.n., 15 May 1895 (ALBC); *Mulliken* s.n., 7 May 1896 (MICH); *Shaddick & Fyfe* s.n., 16 Jun 1895 (MSC); *Skeels* s.n., 13 Sep 1895 (MSC); *Sones* s.n., 20 Apr 1889 (MICH). Cole notes that this occurs along railroad cuts, dry banks, and hillsides, and that it is commonly cultivated; Voss and Reznicek (2012) indicate that the species, although native eastward, is not native in Michigan, but that most of our occurrences are regarded as escapes from cultivation.

POLYGALACEAE (Milkwort Family)

Polygala cruciata L.; Cross-leaved Milkwort; *Skeels & B. E. Livingston* s.n., 12 Aug 1894 (MSC); Diamond St. Swamp, now filled in for residential housing. **SPECIAL CONCERN.**

Polygala paucifolia Willd.; Fringed Polygala, Gay-wings, Flowering-wintergreen; *Skeels* s.n., 8 May 1895 (MSC).

Polygala polygama Walter; Racemed Milkwort; 8 Jul 1893 (MICH); *H. M. Bailey* s.n., 30 May 1892 (MICH); *L. J. Cole* s.n., 23 Jun 1896 (MSC); *Mulliken* s.n., 27 Jun 1896 (MICH); *Skeels* s.n., 11 Jul 1894; *Skeels & Shaddick* s.n., 11 Jul 1897 (MSC); *Sones* s.n., 22 Jun 1891 (MICH).

Polygala sanguinea L.; Field Milkwort; 21 Aug 1892 (MICH); *Skeels & B. E. Livingston* s.n., 28 Aug 1897, *Skeels* s.n., 28 Aug 1897 (MSC); *Sones* s.n., 14 Jun 1890 (MICH).

Polygala senega L.; Seneca Snakeroot, Senega Root; 10 Jun 1893 (MICH); *H. M. Bailey* s.n., 15 Jun 1892 (MICH); *L. J. Cole* s.n., 22 May 1896 (MSC); *Mulliken* s.n., 22 May 1896 (MICH); *Shaddick & Fyfe* s.n., 16 May 1895 (MSC); *Sones* s.n., 13 Jun 1889 (MICH, MO).

POLYGONACEAE (Smartweed Family)

Fagopyrum esculentum Moench; Buckwheat; *H. M. Bailey* s.n., 20 Aug 1890 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Fallopia cilinodis (Michx.) Holub (*Polygonum cilinode* of Cole and of Voss); Fringed False Buckwheat; 30 Jun 1893 (MICH).

Fallopia convolvulus (L.) Á. Löve (*Polygonum convolvulus* of Cole and of Voss); Black-bindweed, False Buckwheat; 1 Oct. 1895 (MICH); *H. M. Bailey* s.n., 19 Jul 1892 (MICH); *Skeels & Shaddick* s.n., 14 Jul 1895 (MSC).

Fallopia scandens (L.) Holub (*Polygonum scandens* of Cole and of Voss); False Buckwheat, Black-bindweed; 26 Jul 1896 (as *P. dumetorum scandens*) (MICH); *M. B. Fallass* s.n., 20 Aug 1893, 20 Aug 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1891 (MICH); *Skeels & Shaddick* s.n., 26 Aug 1896 (MSC).

Persicaria amphibia (L.) Delarbre (*Polygonum amphibia*, *Polygonum hartwrightii* and *Polygonum muhlenbergii* of Cole; *Polygonum amphibia* of Voss; of Cole); Water Smartweed; 30 Aug 1893 (as *P. muhlenbergii*), 1 Sep 1893 (as *P. hartwrightii*), 20 Jul 1898, 26 Aug 1899 (as *P. muhlenbergii*), 30 Aug 1899 (as *P. muhlenbergii*) (MICH); *H. M. Bai-*

- ley* s.n., 14 Aug 1891, 26 Aug 1892 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (ALBC); *Sones* s.n., 2 Jul 1890 (MICH).
- Persicaria arifolia*** (L.) Haraldson (*Polygonum arifolium* of Voss); Tear-thumb; *H. M. Bailey* s.n., 15 Aug 1891 (MICH). Cole did not include this in the *Flora*, although she had consulted Hattie Bailey's personal herbarium; perhaps she had not seen this in the field herself.
- Persicaria hydropiper*** (L.) Delarbre (*Polygonum hydropiper* of Cole and of Voss); Water-pepper; *H. M. Bailey* s.n., 17 Sep 1891 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).
- Persicaria hydropiperoides*** (Michx.) Small (*Polygonum hydropiperoides* of Cole and of Voss); Mild Water-pepper, Water-pepper; 20 Aug 1893; 10 Jul 1896 (MICH); *Mulliken* s.n., 19 Aug 1897 (MICH).
- Persicaria lapathifolia*** (L.) Delarbre (*Polygonum lapathifolium* and *Polygonum incarnatum* of Cole; *Polygonum lapathifolium* of Voss); Willow-weed, Nodding Smartweed; 24 Aug 1899 (as *P. incarnatum*) (MICH).
- Persicaria maculosa*** Gray (*Polygonum persicaria* of Cole and of Voss); Lady's-thumb, Heart's-ease; 30 Jul 1893, 10 Sep 1899 (MICH).
- Persicaria orientalis*** (L.) Spach; (*Polygonum orientale* of Cole and of Voss); Kiss-me-over-the-garden-gate, Prince's Feather; *M. B. Fallass* s.n., 30 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 14 Aug 1896 (MSC).
- Persicaria pensylvanica*** (L.) M. Gómez (*Polygonum pensylvanicum* of Cole and of Voss); Pinkweed, Big-seed Smartweed; 17 Sep 1898, 29 Aug 1899, 10 Sep 1899 (MICH); *H. M. Bailey* s.n., 15 Aug 1891, 23 Sep 1892 (MICH); *Mulliken* s.n., 31 Aug 1897 (MICH).
- Persicaria punctata*** (Elliott) Small (*Polygonum punctatum* of Cole and of Voss); Smartweed; 25 Jul 1893, 1 Sep 1896 (MICH); *M. B. Fallass* s.n., 2 Aug 1893 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 19 Jun 1895 (MICH).
- Persicaria sagittata*** (L.) H. Gross; (*Polygonum sagittatum* of Cole and of Voss); Arrow-leaved Tear-thumb; 8 Aug 1893 (MICH); *H. M. Bailey* s.n., 15 Aug 1891 (MICH); *M. B. Fallass* s.n., 28 Aug 1893 (MICH).
- Persicaria virginiana*** (L.) Gaertn. (*Polygonum virginianum* of Cole and of Voss); Jumpseed; 8 Aug 1893 (MICH); *H. M. Bailey* s.n., 29 Aug 1891 (MICH); *M. B. Fallass* s.n., 20 Jul 1895 (MICH); *Sones* s.n., 8 Jul 1889 (MICH).
- Polygonella articulata*** (L.) Meisn.; Jointweed; 17 Sep 1898 (ALBC); 17 Sep 1898, 1 Sep 1899, 16 Sep 1899, 17 Sep 1899 (MICH); 17 Sep 1898 (MSC).
- Polygonum aviculare*** L.; (*Polygonum littorale* of Cole); Knotweed; 30 Aug 1893, 24 Aug 1899, 27 Aug 1899 (MICH); *H. M. Bailey* s.n., 12 Sep 1892 (MICH).
- Polygonum erectum*** L.; Erect Knotweed; 5 Sep 1893 (MICH); 12 Oct 1893 (MICH); *H. M. Bailey* s.n., 12 Sep 1892 (MICH); *M. B. Fallass* s.n., 12 Oct 1893 (MICH).
- Polygonum tenue*** Michx.; Slender Knotweed; 8 Oct 1898 (ALBC); 26 Aug 1896, 7 Oct 1898, 8 Oct 1898 (MICH); 8 Oct 1898 (MSC).
- Rumex acetosella*** L.; Sheep Sorrel, Red Sorrel; 1 Jun 1893 (MICH); *H. M. Bailey* s.n., 9 Jun 1892 (MICH); *Sones* s.n., 20 May 1889 (MICH).
- Rumex altissimus*** Alph. Wood; Pale Dock; 24 Jun 1897 (MICH); *B. E. Livingston* s.n., 3 Jul 1895 (MICH); *Mulliken* s.n., 29 Jun 1896 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (as *R. verticillatus* (MSC)).
- Rumex crispus*** L.; Curly Dock, Sour Dock; 10 Jun 1894, 26 Jun 1896 (MICH).
- Rumex obtusifolius*** L.; Bitter Dock; 30 Aug 1893, 11 Jul 1896 (MICH); *H. M. Bailey* s.n., 21 Jul 1892 (MICH).
- Rumex orbiculatus*** A. Gray; (*Rumex britannica* of Cole); Great Water Dock; 8 Aug 1893, 30 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 26 Aug 1896 (MSC).
- Rumex verticillatus*** L.; Water Dock; 11 Jun 1896, 17 Jun 1897 (MICH).

PORTULACACEAE (Purslane Family)

Portulacca oleracea L.; Common Purslane, Pusley.

RANUNCULACEAE (Buttercup Family)

Actaea pachypoda Elliott (*Actaea alba* of Cole); White Baneberry, Doll's-eyes; 10 May 1893, 4 Sep 1896, May 1898 (MICH); *H. M. Bailey* s.n., 29 Aug 1891 (MICH).

Actaea rubra (Aiton) Willd. (*Actaea spicata rubra* of Cole); Red Baneberry; *H. M. Bailey* s.n., 20 Jul 1893 (MICH); *Mulliken* s.n., 7 May 1896 (MICH).

- Anemone canadensis* L.; Canada Anemone; 6 Jun 1893 (as *A. Pennsylvanica*) (MICH); *H. M. Bailey* s.n., 14 Jun 1891 (MICH); *Mulliken* s.n., 4 Jun 1895 (MICH); *Skeels* s.n. 19 Jul 1895 (MSC).
- Anemone cylindrica* A. Gray; Thimbleweed; 28 Jun 1893 (MICH); *H. M. Bailey* s.n., 7 Jul 1891, 10 Jul 1893 (MICH); *Mulliken* s.n., 18 Sep 1897 (MICH); *Skeels & Shaddick* s.n., 14 Jul 1895, *Skeels, Shaddick, Fyfe, & B. E. Livingston* s.n., 21 Jul 1895 (MSC); *Sones* s.n., 23 Jun 1889 (MICH).
- Anemone quinquefolia* L.; Wood Anemone; *H. M. Bailey* s.n., 2 May 1891 (MICH); *Skeels & Shaddick* s.n., 12 May 1895, 19 May 1895 (both as *A. nemorosa*) (MSC).
- Anemone virginiana* L.; Thimbleweed; 27 Jun 1893 (MICH); *H. M. Bailey* s.n., 7 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).
- Aquilegia canadensis* L.; Wild Columbine; 10 Jun 1893 (MICH); *Shaddick & Fyfe* s.n., 16 May 1895, 16 May 1895 (MSC); *Sones* s.n., 24 May 1889 (MICH).
- Caltha palustris* L.; Marsh-marigold, Cowslip; 10 May 1894 (MICH); *H. M. Bailey* s.n., 23 Apr 1892 (MICH); *Mulliken & L. J. Cole* s.n., 8 May 1897 (MICH); *Skeels & Shaddick* s.n., 8 May 1895 (MSC).
- Clematis virginiana* L.; Virgin's-bower; 10 Aug 1893 (MICH); 17 Aug 1889 (MICH); *H. M. Bailey* s.n., 30 Jul 1891 (MICH); *Mulliken* s.n., 8 Aug 1896 (MICH); *Skeels, Shaddick, Fife, & B. E. Livingston* s.n., 21 Jul 1895, *Skeels & Shaddick* s.n., 8 Aug 1895, *Skeels & Shaddick* s.n., 23 Aug 1896 (MSC); *Sones* s.n., 24 May 1889 (MICH).
- Coptis trifolia* (L.) Salisb.; Goldthread; *H. M. Bailey* s.n., 7 May 1892 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MSC).
- Enemion biternatum* Raf. (*Isopyrum biternatum* of Cole and of Voss); False Rue-anemone; *H. M. Bailey* s.n., 9 May 1891 (MICH); *L. J. Cole & Mulliken* s.n., 17 Apr 1896; *Shaddick, Mulliken, Fyfe & E. J. Cole* s.n., 23 1897 (MSC).
- Hepatica acutiloba* DC. (*Anemone acutiloba* of Cole); Sharp-lobed Hepatica; *H. M. Bailey* s.n., 4 May 1892 (MICH); *Sones* s.n., 22 Apr 1889 (MICH).
- Hepatica americana* (DC.) Ker Gawl. (*Anemone hepatica* of Cole); Round-leaved Hepatica; *H. M. Bailey* s.n., 9 May 1891 (MICH); *Mulliken* s.n., 2 Nov 1895 (MICH); *Skeels & Shaddick* s.n., 12 May 1895 (as *H. triloba*) (MSC).
- Hydrastis canadensis* L. Cole states, "Only a few plants at any station, but well distributed;" *Elsie Lowes* s.n., 3 Jun 1892 (MICH). It's surprising that there is no Cole collection, since *Elsie Lowes* brought Emma Cole to the Lowes Woods to see *Hybanthus concolor* 10 Jun 1893 where she made a collection. **THREATENED.**
- Nigella damascena* L.; Love-in-a-mist. Cole mentions that this plant is spontaneous in gardens, but that it rarely escapes.
- Ranunculus abortivus* L.; Small-flowered Buttercup; 25 May 1893, 5 Jun 1897 (MICH); 30 Apr 1889 (MICH); *H. M. Bailey* s.n., 9 May 1891 (MICH); *M. B. Fallass* s.n., Jun 1897 (MICH); *Matteson* s.n., 18 May 1893, *Skeels & Shaddick* s.n., 12 May 1895 (MSC).
- Ranunculus acris* L.; Common Buttercup, Tall Buttercup; 19 Jun 1897 (MICH); *Mulliken* s.n., 1 Aug 1897, 1 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 24 Aug 1895 (MSC).
- Ranunculus longirostris* Godr. (*Ranunculus circinatus* of Cole); White Water Crowfoot; 20 Jun 1892 (MICH); *H. M. Bailey* s.n., 24 Jun 1892 (MICH); *Mulliken* s.n., 1895, 20 Jun 1896 (MICH); *Shaddick & Fyfe* s.n., 30 May 1896 (MSC).
- Ranunculus fascicularis* Bigelow; Early Crowfoot; *H. M. Bailey* s.n., 8 May 1892 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 20 May 1897 (MICH); *Skeels & Shaddick* s.n., 9 May 1897 (MSC).
- Ranunculus flabellaris* Raf. (*Ranunculus multifidus* of Cole); Yellow Water Crowfoot; 12 May 1893 (MICH); *C. W. Fallass* s.n., 19 May 1894 (ALBC); *Sones* s.n., 10 May 1889 (MICH).
- Ranunculus hispidus* Michx. (*Ranunculus septentrionalis* of Cole); Swamp Buttercup; 20 Apr 1893, 25 May 1895, 29 May 1897, 20 May 1898 (MICH); *H. M. Bailey* s.n., 22 May 1892 (MICH); *Matteson* s.n., 27 Apr 1893 (MSC); *Mulliken* s.n., 16 May 1895 (MICH), 31 May 1897 (US); *Skeels & Shaddick* s.n., 12 May 1895, *Shaddick* s.n., 12 May 1896, (all as *R. septentrionalis*) (MSC).
- Ranunculus pensylvanicus* L. f.; Bristly Crowfoot; 20 Jul 1896 (MICH); *H. M. Bailey* s.n.,

28 Jul 1891, 18 Jul 1893 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (MICH); 28 Jul 1895 (MSC).

Ranunculus recurvatus Poir.; Hooked Crowfoot; 25 May 1893, 20 May 1898 (MICH); *H. M. Bailey* s.n., 1891 (MICH); *Mulliken* s.n., 22 May 1897 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MSC); *Sones* s.n., 10 May 1889 (MICH).

Ranunculus rhomboideus Goldie; Prairie Buttercup. This rare species was not included in the *Flora*, being collected in 2 localities the same year her work was published: Grand Rapids Twp., May 1901 (MSC), and Cascade Twp., 2 Jun 1901 (ALBC); 1 Jul 1901 (MICH). A known locality in northeastern Kent County was searched in 2016 with no success. **THREATENED.**

Ranunculus sceleratus L.; Cursed Crowfoot; 1 Jun 1894 (MICH); *C. W. Fallass* s.n., 19 May 1894 (ALBC).

Thalictrum dasycarpum Fisch. & Ave-Lall. (*Thalictrum purpurascens* of Cole); Purple Meadow-rue; 30 Jun 1893 (as *T. polygamum*) (MICH); *Mulliken* s.n., 28 Jul 1897 (MICH); *Skeels* s.n., 19 Jul 1895 (MSC).

Thalictrum dioicum L.; Early Meadow-rue; 20 Apr 1893 (MICH); *H. M. Bailey* s.n., 14 May 1892 (MICH); *Sones* s.n., 30 Apr 1889 (MICH).

Thalictrum thalictroides (L.) Eames & B. Boivin (*Anemone thalictroides* of Cole; *Anemonella thalictroides* of Voss); Rue-anemone; 10 May 1893 (MICH); *H. M. Bailey* s.n., May 1892 (MICH); *Mulliken* s.n., 14 May 1897 (MICH).

RHAMNACEAE (Buckthorn Family)

Ceanothus americanus L.; New Jersey Tea; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 12 Jul 1892 (MICH); *Mulliken* s.n., 1895 (MICH); *Sones* s.n., 6 Jul 1889 (MICH).

Rhamnus alnifolia L'Her.; Alder-leaved Buckthorn; *Sones* s.n., 14 May 1889 (MICH); *C. W. Fallass* s.n., 15 May 1895 (ALBC).

ROSACEAE (Rose Family)

Agrimonia gryposepala Wallr. (*Agrimonia hirsuta* of Cole); Tall Agrimony; 26 Jul 1893 (as *A. eupatoria*), 28 Aug 1899 (MICH); 30 Jul 1889 (MICH); *Mulliken* s.n., 27 Jul 1895 (MICH); *Skeels, Shaddick, Fife & B. E. Livingston* s.n. 2 Jul 1895 (MSC).

Agrimonia pubescens (*Agrimonia parviflora* of Cole); Soft Agrimony; 1 Sep 1899 (as *A. mollis*), 12 Sep 1899, 20 Aug 1900 (MICH).

Amelanchier arborea (F. Michx) Fernald; Juneberry; *Mulliken* s.n., 8 May 1897 (MICH) *Mulliken & L. J. Cole* s.n., 8 May 1897 (MICH).

Amelanchier bartramiana (Tausch) M. Roem.; Northern Juneberry; one specimen at MICH ("D. G. H. & M. Ry. east of the City"), annotated as *A. bartramiana*, which represents the only southern Michigan occurrence (MICHIGAN FLORA ONLINE 2011).

Amelanchier laevis Wiegand; Smooth Shadbush; *H. M. Bailey* s.n., 2 May 1891 (MICH); *Sones* s.n., 26 Apr 1889 (MICH); *Mulliken* s.n., 8 May 1897 (MICH); *Mulliken & L. J. Cole* s.n., 8 May 1897 (MICH).

Amelanchier spicata (Lam.) K. Koch (*Amelanchier canadensis oblongata* and *A. rotundifolia* of Cole); Shadbush Serviceberry; 15 Jun 1893 (as *A. canadensis oblongata*), 5 Sep 1899 (as *A. rotundifolia*) (MICH).

Aronia prunifolia (Marshall) Rehder; Chokeberry (*Pyrus arbutifolia* and *P. arbutifolia melanocarpa* of Cole); 1 Jun 1894 (as *P. arbutifolia*), 1 Jun 1894 (as *P. arbutifolia melanocarpa*) (MICH); *C. W. Fallass* s.n., 19 May 1894, 15 May 1895 (ALBC). Cole noted both taxa growing together, but her report of the typical variety of *Pyrus arbutifolia* was in error, although *Aronia arbutifolia* has recently been found in Cannon Twp., Kent Co. (Ryskamp and Warners 2012).

Comarum palustre L.; Marsh Cinquifol (*Potentilla palustris* of Cole and of Voss); 1 Jun 1894 (MICH); *H. M. Bailey* s.n., 24 Ju 1892 (MICH); *Mulliken* s.n., 4 Jun 1896 (MICH).

Crataegus. This is a difficult genus, whose taxonomy has been complicated by its tendency toward hybridization, polyploidy, and reproduction by apomixis; Cole was actively studying, and quickly becoming an expert on, the genus; most of her collections were made in 1901-1904. The large number of Cole specimens of this genus attracted the attention of Charles Sprague Sargent, prompting him to come to Grand Rapids to visit her in September 1901 (Stivers, unpublished manuscript). She collaborated with him in the preparation

of *Crataegus* for Sargent's *Trees and Shrubs* (Sargent 1902); Sargent named *Crataegus coleae* for Cole in that volume, the type locality being Grand Rapids. Cole continued her correspondence with Sargent and in 1904 spent the summer working for him at the Arnold Arboretum of Harvard University (Stivers, unpublished manuscript).

The taxa listed here are based on annotated Cole specimens from 1890–1905, but it is difficult to determine which species listed in *Grand Rapids Flora* are connected with which specimens at MICH; furthermore, the names on her labels do not correspond to species listed in the *Flora*; some of these names appeared later in C. S. Sargent's "*Crataegus* in Southern Michigan" (Sargent 1907). Since *Crataegus* was Cole's last major botanical effort prior to her death in 1910, I have included taxa she collected subsequent to the publication of her *Flora* in 1901, and the treatment presented here represents the treatment that would likely have been published in Cole's *Flora*, had she been able to complete her studies of *Crataegus* prior to publication.

Crataegus brainerdii Sarg. (*Cratagus pringuis* of Voss); Hawthorn; 20 May 1901, 20 Sep 1901, 3 Oct 1901, 17 May 1902, Sep 1902, 22 May 1903, 20 May 1903, 22 May 1903, 26 Sep 1903, 16 May 1904, 16 May 1904, 9 Sep 1904, 24 Sep 1904 (MICH). All Cole specimens collected 1901–04 have labels bearing the name *C. urbana*, a name not published until 1907 and which is now regarded as a synonym of *C. brainerdii*.

Crataegus coccinea L. (*Cratagus pedicellata* of Voss); Hawthorn; Sep 1896 (as *C. coccinea*), 15 May 1901 (as *C. pura*), 20 Sep 1901 (as *C. attenata*), 16 May 1902 (as *C. pura*) 5 Sep 1902 (as *C. pura*), 5 May 1904 (MICH); *Skeels* s.n., 2 Sep 1895 (MICH) (as *C. pura*). *Crataegus pura* was a Sargent name not published until 1907.

Crataegus coleae Sarg.; Cole's Hawthorn; 22 May 1901 (2 isoelectotypes, A, K, MICH), 19 May 1903, 20 May 1903, 24 Sep 1903, 29 Sep 1904 (MICH). A new species described by Charles Sprague Sargent and named for Emma Cole; he added this delightful line at the end of the article: "It is a pleasure to associate with this handsome shrub the name of its discoverer, Miss Emma J. Cole of Grand Rapids, Michigan, the author of *The Grand Rapids Flora*, and a careful and industrious student of the plants of central Michigan, where she has made a number of other important discoveries" Sargent (1902).

Crataegus crus-galli L. (including *Cratagus fontanesiana* of Voss); Cockspur Thorn; 1 Jun 1894, 9 Oct 1897, 30 May 1901, 26 May 1904 (MICH); *Skeels* s.n., 12 Oct 1895 (CU); *Skeels* s.n., 29 May 1895 (MICH), 20 Oct 1895 (MICH).

Crataegus dodgei Ashe; Hawthorn; 22 May 1902, 5 Sep 1902, Sep 1902 (MICH); 22 May 1902, 5 Sep 1902 (MO).

Crataegus intricata Lange (*Cratagus foetida* of Voss); Hawthorn; 9 May 1901, 18 May 1901, 25 May 1901, 26 May 1901 (MICH); 30 May 1901 (3 isosyntypes of *C. bealii* Sarg., A, K, MICH); 9 May 1901, 29 May 1901, 30 May 1901, 1 Jun 1901, 18 May 1903, 9 Sep 1901, 8 Sep 1902, 9 Sep 1902, 10 Sep 1902, 13 Sep 1902, 18 Sep 1902, 20 Sep 1902, 18 May 1903, 1 Oct 1904, 20 Sep 1905, 5 May 1905, 30 May 1908 (MICH); *H. M. Bailey* s.n., 16 Apr 1895 (MICH). Many of Cole's labels bear the name *C. bealii*, apparently reflecting her intention to name the plant for W. J. Beal of Michigan Agriculture College. The binomial was ultimately published by Sargent (1907).

Crataegus jesupii Sarg. (*Cratagus filipes* of Voss); Hawthorn; 3 Jun 1893, 14 Oct 1897, 27 Sep 1902, 19 May 1903 (ALBC); 18 May 1901, 30 May 1901, 20 Sep 1901, 26 Sep 1901, 19 May 1902, 27 Sep 1902 (MICH). Cole's specimen labels bear the name *C. bellula*, a then unpublished name.

Crataegus macrosperma Ashe (including *Cratagus merita* and *C. brumalis* of Voss); Hawthorn; 13 May 1901, 15 May 1901, 15 May 1901 (as *C. marita*), 20 Sep 1901, 19 May 1902, 3, Sep 1902, 5 Sep 1902, May 1903, 15 May 1903, 5 Sep 1904, 29 Sep 1904 (MICH).

Crataegus margaretta Ashe; Hawthorn; 10 Jul 1899 (MICH).

Crataegus mollis (Torr. & A. Gray) Scheele (including var. *sera* of Voss); Hawthorn; 20 May 1894 (as *C. coccinea mollis*), 26 May 1901 (as *C. mollipes*, a name published in 1907), 9 May 1902, 13 May 1902 (as *C. sera*), 2 Sep 1902, 20 Sep 1902 (as *C. sera*), 13 May 1904 (as *C. sera*), 12 Sep 1904 (as *C. sera*) (MICH); *Skeels & Shaddick* s.n., 25 Aug 1896 (CU).

Crataegus populnea Ashe; Hawthorn (including *Cratagus beata*, *C. compta*, *C. gravis*, *C. iracunda*, and *C. levis* of Voss); 15 May 1901 (as *C. ambitiosa*), 16 Sep 1902, 17 May 1903

- (both as *C. allecta*) (MICH), 17 May 1903 (as *C. perlaeta*) (MICH); 28 Sep 1904 (as *C. perlaeta*) (MO). Two specimens bear the name *C. perlaeta*, a name not published by Sargent until 1907.
- Crataegus pruinosa*** (H. L. Wendl.) K. Koch (including *Crataegus leiophylla* and *C. rugosa* of Voss); Hawthorn; 18 May 1901, 15 May 1902, 21 May 1902 (as then unpublished *C. horridula*), 20 Sep 1902 (as *C. horridula*), 25 Sep 1902 (as *C. permapla*), Sep 1903 (as then unpublished *C. allecta*), 14 Sep 1903, 30 May 1904 (as *C. horridula*), 19 Sep 1905 (as *C. horridula*) (MICH); *Mulliken & L. J. Cole* s.n., 22 May 1896 (MICH).
- Crataegus punctata*** Jacq. (*Crataegus nitidula* of Voss); Dotted Hawthorn, White Haw; 1 Jun 1893, 30 May 1901 (MICH); *H. M. Bailey* s.n., 16 May 1895 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC).
- Crataegus succulenta*** Link (*Crataegus macracantha* of Cole; as *C. succulenta* var. *macracantha* and var. *succulenta* in Voss); Hawthorn; 22 May 1902 (*C. gemmosa*) (ALBC); 22 May 1892 (as *C. gemmosa*), 10 Oct 1896 (as *C. coccinea*), 20 Sep 1901 (*C. gemmosa*), 25 Oct 1901 (MICH); *Skeels & Shaddick* s.n., 19 May 1895 (MICH), 18 Sep 1895 (MICH); *L. J. Cole* s.n., 15 May 1897 (MSC).
- Dasiphora fruticosa*** (L.) Rydb. (*Potentilla fruticosa* of Cole and of Voss); Shrubby Cinquifol; 12 Aug 1893 (MICH); *H. M. Bailey* s.n., 30 Jul 1891 (MICH); *Mulliken* s.n., 22 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MICH).
- Drymocallis arguta*** (Pursh) Rydb. (*Potentilla arguta* of Cole and of Voss); Tall Cinquefoil, Prairie Cinquefolia; 20 Jun 1897 (ALBC); *H. M. Bailey* s.n., 18 Jul 1893 (MICH).
- Filipendula rubra*** (Hill) B. L. Rob. (*Spiraea lobata* of Cole); Queen-of-the-prairie; 23 Jun 1896 (as *Spiraea lobata*) (MICH); *H. M. Bailey* s.n., Sep 1894 (MICH); *Mulliken* s.n., 4 Aug 1896 (MICH); *Skeels, Shaddick, B. E. Livingston, & Fyfe* s.n., 21 Jul 1895 (MICH); *Skeels & Rogers* s.n., 2 Sep 1895 (MSC). As early as 1901, Cole considered this marsh species "rare." **THREATENED.**
- Fragaria vesca*** L. (*Fragaria americana* of Cole); Woodland Strawberry; 31 May 1894 (MICH).
- Fragaria virginiana*** Mill.; Strawberry; 12 May 1893, 1 Sep 1897, 30 May 1897 (MICH); *H. M. Bailey* s.n., 28 May 1891 (MICH); *C. W. Fallass* s.n., 26 May 1894, 15 May 1895 (ALBC); *Mulliken* s.n., 21 May 1895 (MICH); *Sones* s.n., 10 May 1889 (MICH).
- Geum aleppicum*** Jacq.; Yellow Avens (*Geum strictum* of Cole); 8 Jul 1893 (MICH); *H. M. Bailey* s.n., 3 Jul 1891 (MICH); *Mulliken* s.n., 4 Jul 1895, 24 Jul 1895 (MICH); *Mulliken & [L. J.] Cole* s.n., 27 Jun 1896 (MICH).
- Geum canadense*** Jacq. (*Geum album* of Cole); White Avens; 1 Jul 1893 (MICH); *H. M. Bailey* s.n., 11 Jul 1891 (MICH).
- Geum fragarioides*** (Michx.) Smedmark (*Waldsteinia fragarioides* of Cole and of Voss); Barren Strawberry; Cole notes that she observed it in 1890 and 1891, but had not taken a voucher specimen.
- Geum laciniatum*** Murray (*Geum virginianum* of Cole); Rough Avens; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 29 Jun 1892 (MICH).
- Geum rivale*** L.; Purple Avens; 30 May 1894 (MICH); *C. W. Fallass* s.n., 26 May 1894 (ALBC); *Mulliken* s.n., 18 May 1896 (MICH); *Sones* s.n., 12 May 1889 (MICH).
- Geum triflorum*** Pursh; Prairie Smoke; Jun 1899 (ALBC); 30 May 1900 (MICH); *B. E. Livingston* s.n., 1 Jun 1897 (MSC); *Jennie D. Livingston* s.n., 1897 (MICH). Cole stated: "Mrs. Keziah Livingston, a pioneer settler, reports this species as having been abundant in 1842 on dry gravelly soil, south of Burton Ave., between East St. and South Division St., and as having gradually disappeared after settlements began. But afterwards no trace of it was found by botanists until 1897 when Miss Jennie Livingston found a patch containing about one hundred plants, on the bluffs of Plaster Creek, east of Madison Ave. This was destroyed in the autumn of 1898 when the land was cleared and cultivated. It has been reported only from two other localities in the State." It is now known in Michigan from 7 counties. **THREATENED.**
- Malus coronaria*** (L.) Mill. (*Pyrus coronaria* of Cole); American Crab, Sweet Crab, Wild Crab; 1 Jun 1893 (MICH); 12 May 1889 (MICH); *Mulliken* s.n., 20 May 1897 (MICH).
- Malus pumila*** Mill. (*Pyrus malus* of Cole); Apple. Cole notes this widely cultivated tree as "[s]pontaneous in thickets along roadsides." Curiously no specimens in the MICHIGAN

- FLORA ONLINE (2011) database documented this species in Kent County before 1995 and Ottawa County before 2012.
- Physocarpus opulifolius*** (L.) Maxim. (*Neillia opulifolia* of Cole); Ninebark; 10 Jun 1895 (MICH); *H. M. Bailey* s.n., 11 Aug 1891 (MICH); *Mulliken* s.n., 19 Jun 1897 (MICH); *Skeels, Shaddick, B. E. Livingston & Fyfe* s.n., 21 Jul 1895 (MICH).
- Potentilla argentea*** L.; Silvery Cinquifol; 3 Jul 1894 (MICH); *H. M. Bailey* s.n., 9 Jun 1892 (MICH); *Mulliken* s.n., 27 Jul 1897 (MICH); *Skeels* s.n., 19 Aug 1895 (MICH).
- Potentilla norvegica*** L.; Rough Cinquifol; 30 Jun 1893 (MICH).
- Potentilla simplex*** Michx.; Old-field Cinquifol, Common Cinquifol; 3 Jun 1893 (MICH); *H. M. Bailey* s.n., 7 Jun 1892 (MICH); *Mulliken* s.n., 21 May 1895 (MICH); *Sones* s.n., 11 Jun 1889 (MICH).
- Prunus americana*** Marshall; American Wild Plum; 25 May 1893, 11 Jun 1899 (as *P. nigra*), 10 Aug 1899 (as *P. nigra*), 23 May 1900 (as *P. nigra*); 18 Sep 1897 (MICH).
- Prunus avium*** L.; Sweet Cherry.
- Prunus cerasus*** L.; Sour Cherry, Pie Cherry.
- Prunus nigra*** Aiton; Canada Plum; *Sones* s.n., 6 May 1889 (MICH).
- Prunus persica*** (L.) Batsch; Peach.
- Prunus pensylvanica*** L. f.; Fire Cherry, Pin Cherry; 5 May 1893, 10 Jul 1898 (MICH).
- Prunus pumila*** L.; Sand Cherry; *Mulliken* s.n., 14 May 1897 (MICH).
- Prunus serotina*** Ehrh.; Wild Black Cherry; 1 Jun 1894 (MICH).
- Prunus virginiana*** L.; Choke Cherry; *H. M. Bailey* s.n., 23 May 1891 (MICH); *Mulliken* s.n., 6 Jul 1895, 4 May 1896 (MICH); *Sones* s.n., 15 May 1889 (MICH).
- Rosa blanda*** Aiton; Wild Rose; *S. O. Livingston* s.n., 21 May 1896 (MICH); *Mulliken* s.n., 25 Jun 1895 (MICH).
- Rosa carolina*** L. (including *Rosa humilis* of Cole); Pasture Rose; 25 Jun 1893, 10 Jul 1893, 12 Jul 1897, 21 Jul 1897 (MICH); 16 Jun 1895 (MICH); *H. M. Bailey* s.n., 4 Jul 1892 (MICH).
- Rosa cinnamomea*** L.; Cinnamon Rose. Cole states that it “[p]ersists by roadsides near pioneer dwellings,” but no documentation for either Kent County or Ottawa County exists (Voss and Reznicek 2012).
- Rosa palustris*** Marshall; Swamp Rose; 10 Jul 1893 (as *R. carolina*) (MICH); *H. M. Bailey* s.n., 15 Jul 1892 (MICH); *Skeels* s.n., 19 Jul 1895 (MICH).
- Rosa rubiginosa*** L. (*Rosa eglanteria* of Voss); Sweetbriar; 1 Jul 1893 (MICH); *Mulliken* s.n., 10 Aug 1897 (MICH).
- Rubus allegheniensis*** Porter; Common Blackberry; 20 Jun 1893 (as *R. villosus*) (MICH); *C. W. Fallass* s.n., 31 May 1894 (ALBC). Cole states that *R. villosus* is “[t]he blackberry of the markets.”
- Rubus flagellaris*** Willd. (*Rubus setosus* of Cole); Northern Dewberry; 5 Jun 1899 (as *R. setosus*) (MICH); *H. M. Bailey* s.n., 1 Jul 1892 (MICH); *C. W. Fallass* s.n., 31 May 1894 (ALBC); *M. B. Fallass* s.n., Jun 1895 (MICH); *Mulliken* s.n., 27 Jun 1897 (MICH); *Skeels & Shaddick* s.n., 28 Jul 1895 (MICH).
- Rubus hispidus*** L.; Swamp Dewberry; 29 Jun 1893 (MICH); 12 Jul 1892 (MICH).
- Rubus occidentalis*** L.; Black Raspberry; 13 May 1899 (as *R. neglectus*) (MICH); *Mulliken* s.n., 19 Jul 1897 (MICH). Cole’s specimen at MICH from “Bowen Station along D.G.R. & W. Ry.” is annotated as *R. occidentalis* (but noted by Cole as intermediate between *R. occidentalis* and *R. strigosus* (= *Rubus* × *neglectus* Peck); see comment under *R. occidentalis* in MICHIGAN FLORA ONLINE (2011).
- Rubus pensilvanicus*** Poir (*Rubus villosus* of Cole); Dewberry; *M. B. Fallass* s.n., Jun 1896 (as *R. villosus*) (MICH).
- Rubus pubescens*** Raf. (*Rubus triflorus* of Cole); Dwarf Raspberry; 12 May 1893, 8 Jul 1896 (MICH).
- Rubus strigosus*** Michx.; Wild Red Raspberry; 30 Jun 1893 (MICH).
- Sorbus aucuparia*** L.; European Mountain-ash; May 1898 (MICH). Cole says: “[p]robably spontaneous from seeds dropped by birds.”
- Sorbus decora*** (Sarg.) C. K. Schneid. (*Sorbus sambucifolia* and *S. americana* of Cole); Mountain-ash; 12 Aug 1896 (MICH).
- Spiraea alba*** Du Roi (*Spiraea salicifolia* of Cole, a European species); Meadowsweet; 8 Jul

1893 (MICH); *H. M. Bailey* s.n., 23 Jul 1891 (MICH); *Mulliken* s.n., 24 Jul 1895 (MICH); *Sones* s.n., 20 Jul 1889 (MICH).

Spiraea tomentosa L.; Hardhack, Stepplebush; 15 Aug 1893 (MICH); *Sones* s.n., 10 Aug 1891, 16 Aug 1891 (MICH).

RUBIACEAE (Madder Family)

Cephalanthus occidentalis L.; Buttonbush; 1 Sep 1893 (MICH); *H. M. Bailey* s.n., 24 Jul 1891 (MICH); *Mulliken* s.n., 12 Jul 1895 (MICH); *Skeels* s.n., 19 Jul 1895 (MICH).

Galium aparine L.; Goosegrass, Cleavers, Annual Bedstraw; 10 May 1894 (MICH); *C. W. Fallass* s.n., 26 May 1894 (ALBC); *Mulliken* s.n., 22 May 1897 (MICH); *Sones* s.n., 13 May 1889 (MICH).

Galium asprellum Michx.; Rough Bedstraw; 25 Jul 1893 (MICH); *H. M. Bailey* s.n., 20 Jul 1891 (MICH); *Mulliken* s.n., 23 Aug 1897 (MICH); *Sones* s.n., 19 Jul 1889 (MICH).

Galium boreale L.; Northern Bedstraw; 30 Jun 1893 (MICH); 2 Jul 1890 (MICH); *H. M. Bailey* s.n., 13 Jun 1892 (MICH).

Galium circaezans Michx.; White Wild Licorice; 30 Jun 1893, 20 Jul 1893 (MICH); 18 Sep 1897 (MICH).

Galium labradoricum (Wiegand) Wiegand; Bog Bedstraw; 18 May 1896 (as *G. trifidum pusillum*) (MICH).

Galium lanceolatum Torr.; Yellow Wild Licorice; 30 Jun 1893 (MICH); *H. M. Bailey* s.n., 1 Jul 1892 (MICH).

Galium obtusum Bigelow; Wild Madder; 22 Ju 1897 (as *G. trifidum*), 26 Jun 1897 (as *G. trifolium latifolium*) (MICH); *H. M. Bailey* s.n., 27 Jun 1892 (MICH); *C. W. Fallass* s.n., 15 Jun 1894 (ALBC).

Galium pilosum Aiton; Hairy Bedstraw; 18 Jul 1896 (MICH); *H. M. Bailey* s.n., 19 Jul 1892, 13 Jul 1893 (MICH); *Skeels* s.n., 8 Oct 1895 (MSC).

Galium tinctorium L.; Stiff Bedstraw (including *Galium claytonii* of Cole); 21 Jul 1898 (as *G. trifidum*), 6 Jul 1898 (as *G. trifidum*), 8 Jul 1899 (as *G. claytonii*) (MICH).

Galium trifidum L.; Beadstraw; 3 Jul 1898 (MICH).

Galium triflorum Michx.; Fragrant Bedstraw; 30 Jun 1893 (MICH).

Houstonia longifolia Gaertn.; Long-leaved Bluets; 30 Jun 1893 (as *H. purpurea longifolia*) (MICH).

Mitchella repens L.; Partridge-berry; *H. M. Bailey* s.n., 11 Jul 1891 (MICH); *Shaddick* s.n., 19 May 1895 (MICH).

RUTACEAE (Rue Family)

Ptelea trifoliata L.; Wafer-ash, Hop-tree; 23 Jun 1894 (MICH); *Mulliken* s.n., 12 Jul 1895 (MICH); *Mulliken & L. J. Cole* s.n., 22 May 1896 (MICH).

Zanthoxylum americanum Mill.; Prickly-ash; 20 May 1892, 25 Apr 1893 (MICH); *H. M. Bailey* s.n., s.d. (MICH).

SALICACEAE (Willow Family)

Populus alba L.; Silver Poplar, White Poplar. This now weedy European tree was considered escaped, but "occasional," by Cole.

Populus balsamifera L.; Balsm Poplar, Hackmatack; 29 May 1899 (MICH) *H. M. Bailey* s.n., 25 Apr 1892 (MICH).

Populus deltoides Marshall (*Populus monilifera* of Cole); Cottonwood; 3 Apr 1897 (MICH).

Populus grandidentata Michx.; Large-tooth Aspen, Big-tooth Aspen; *Skeels* s.n., 26 Apr 1896 (as *P. tremuloides*) (MSC).

Populus tremuloides Michx.; Quaking Aspen, Small-tooth Aspen; 10 Apr 1896 (MICH); *Mulliken* s.n., 4 Jul 1896 (MICH).

Salix alba L.; White Willow.

Salix amygdaloides; Peach-Leaved Willow; 5 May 1896, 5 May 1898, 11 Jun 1899 (MICH); *M. B. Fallass* s.n., s.d. (MICH); *Wheeler* s.n., 17 May 1895, 11 Jun 1895 (MICH).

Salix bebbiana Sarg. (*Salix rostrata* of Cole); Beaked Willow, Bebb's Willow; 18 Apr 1896 (MICH),

Salix candida Willd.; Hoary Willow, Sage Willow; 12 May 1896, 22 May 1896 (as *S. candida* × *S. cordata*) (MICH); *Mulliken* s.n., 31 May 1897 (MICH).

Salix cordata Michx.; Sand-dune Willow, Furry Willow, Heart-leaved Willow

- Salix discolor* Muhl.; Pussywillow; 23 Apr, 18 Apr 1896 (as *S. rostrata*) (MICH); Mulliken & L. J. Cole s.n., 17 Apr 1896 (MICH).
- Salix eriocephala* Michx.; Willow; 18 Apr 1896 (as *S. rigida*) (MICH); Apr 1894 (MICH).
- Salix exigua* Nutt.; Sandbar Willow; 30 May 1894 (as *S. interior*) (MICH); Mulliken s.n., 15 May 1895 (MICH).
- Salix humilis* Marshall; Upland Willow, Prairie Willow; 20 May 1894 (MICH); H. M. Bailey s.n., 23 Apr 1892 (MICH); M. B. Fallass s.n., Apr 1894 (ALBC); Mulliken s.n., 17 Apr 1897 (MICH).
- Salix lucida* Muhl.; Shining Willow; Apr 1894, 6 May 1894 (both as *S. serissima*); Mulliken & E. J. Cole s.n., 2 May 1896 (MICH).
- Salix myricoides* Muhl. (*Salix glaucophylla* of Cole); Blue-leaf Willow; 17 Apr 1896 (MICH).
- Salix nigra* Marshall; Black Willow; 10 May 1893 (MICH); 17 May 1895 (MSC); L. J. Cole s.n., 15 May 1895 (MSC); Mulliken s.n., 10 May 1896 (MICH); Mulliken & E. J. Cole s.n., 2 May 1896 (MICH); Wheeler s.n., 17 May 1895 (MICH).
- Salix pedicellaris* Pursh (*Salix myrtilloides* of Cole); Bog Willow; 16 May 1896 (MICH).
- Salix petiolaris* Sm.; Slender Willow, Meadow Willow; 21 Apr 1896 (as *S. candida*), 28 Apr 1896 (as *S. subsericea*, a pubescent form), s.n., s.d. (Webster's Lake) (MICH); Wheeler s.n., 17 May 1895 (MICH).
- Salix purpurea* L.; Purple-osier Willow, Basket Willow; 7 Apr 1901 (ALBC, MICH). Cole reports that this European species was planted on the bank of the Rouge River (now spelled Rogue), near the Plainfield Village and was used for making baskets. In a letter to Luther S. Livingston, Cole's valued proofreader, she wrote: "The Rouge River was so called because of its reddish water, but soon became pronounced *rogue* because at Plainfield so many reckless characters gathered, but it still retains its original spelling" (Emma J. Cole, April 10, 1900, unpublished letter in Gray Herbarium Archives). The 1918 State of Michigan topographic map (Cedar Springs Quadrangle) showing Plainfield Twp. confirms this earlier spelling.
- Salix sericea* Marshall; Silky Willow; 17 May 1876 (MICH); 28 Apr 1896 (MSC).
- Salix serissima* (L.H. Bailey) Fernald; Autumn Willow; Cole s.d. (Vergennes) (as *S. lucida*) (MICH).

SANTALACEAE (Sandalwood Family)

- Comandra umbellata* (L.) Nutt.; Bastard-toadflax, Star-toadflax; 20 Jun 1893 (MICH); H. M. Bailey s.n., 1 Jul 1892 (MICH).

SAPINDACEAE (Soapberry Family)

- Acer negundo* L. (*Negundo aceroides* of Cole); Box-elder; 28 Apr 1894 (MICH); M. B. Fallass s.n., s.d. (MICH); Skeels & Shaddick s.n., 25 Aug 1895 (MSC).
- Acer nigrum* F. Michx.; Black Maple (*Acer saccharum nigrum* of Cole; *A. saccharum* var. *nigrum* of Voss); 15 May 1894 (MICH).
- Acer pensylvanicum* L.; Striped Maple, Moosewood, Goosefoot Maple. Doubtful. Cole notes: "No herbarium specimens," but she credits the Burton Avenue Swamp site observation to Homer Skeels and Jennie Shaddick. It's hard to believe that this northern small tree with such distinctive green and white striped stems could be misidentified, although the Burton Avenue Swamp was known for some northern elements. It's very surprising that they would not have collected a specimen.
- Acer rubrum* L.; Red Maple; H. M. Bailey s.n., 15 Apr 1892 (MICH); Skeels & Shaddick s.n., 12 Apr 1896 (MSC); Sones s.n., 20 May 1889 (MICH).
- Acer saccharinum* L.; Silver Maple; 20 May 1895 (as *A. dasycarpum*) (MICH).
- Acer saccharum* Marshall; Sugar Maple; 15 May 1894 (as *A. saccharinum*); Skeels & Shaddick s.n., 18 Aug 1895 (as *A. saccharinum*) (MICH, MSC).
- Acer spicatum* Lam.; Mountain Maple; 8 Jun 1896, 3 Jun 1900, 3 Jun 1900 (MICH).

SARRACENIACEAE (Pitcher-plant Family)

- Sarracenia purpurea* L.; Pitcher-plant; H. M. Bailey s.n., Jun 1891 (MICH); Mulliken s.n., 25 Jun 1895 (MICH). Although no Cole specimen is known, I found this species to still be common in the bog (Miller's Lake) across the road from where she grew up in Vergennes Twp.

SAURURACEAE (Lizard's-tail Family)

Saururus cernuus L.; Lizard's-tail; 15 Jul 1896 (MICH); *D. S. Bailey* s.n., 15 Jul 1893 (MICH); *Mulliken* s.n., 21 Jul 1897 (MICH).

SAXIFRAGACEAE (Saxifrage Family)

Chrysosplenium americanum Hook.; Golden Saxifrage; 20 May 1899 (MICH).

Heuchera americana L.; Alum-Root; *Sones* s.n., 7 Jul 1889 (MICH).

Heuchera richardsonii R. Br.; Alum-root; 20 Jun 1893 (MICH); *H. M. Bailey* s.n., 15 Jul 1991. Cole's specimen is annotated as "probably" (*H. richardsonii*), but that the calyx is not very deeply notched.

Micranthes pennsylvanica (L.) Haw.; Swamp Saxifrage (*Saxifraga pennsylvanica* of Cole and of Voss); 12 Jun 1893 (MICH); *Sones* s.n., 18 May 1889 (MICH).

Mitella diphylla L.; Bishop's-cap; 20 Apr 1895, 23 Apr 1896 (MICH); *H. M. Bailey* s.n., 24 May 1891 (MICH); *Mulliken* s.n., 3 May 1895 (MICH); *Sones* s.n., 14 May 1889 (MICH).

Mitella nuda L.; Naked Miterwort; 28 May 1894 (MICH).

SCROPHULARIACEAE (Figwort Family)

Scrophularia lanceolata Small (*Scrophularia leporella* of Cole); Early Figwort; 19 Jun 1894 (as *S. nodosa marylandica*); 30 May 1900 (MICH); 21 Jul 1889 (MICH); *M. B. Fallass* s.n., 15 Jun 1895 (MICH); *Mulliken* s.n., 19 Jun 1897 (MICH).

Scrophularia marilandica L.; Late Figwort (*Scrophularia nodosa marylandica* of Cole); 29 Sep 1899 (MICH); *Skeels & Shaddick* s.n., 25 Aug 1895 (MSC).

Verbascum blattaria L.; Moth Mullein; 12 Aug 1893 (MICH); 4 Aug 1888 (MICH) *H. M. Bailey* s.n., 25 Sep 1892 (MICH).

Verbascum thapsus L.; Common Mullein; 30 Jul 1893 (MICH); *H. M. Bailey* s.n., 29 Jul 1892 (MICH); *Mulliken* s.n., 19 Jul 1897 (MICH).

SIMAROUBACEAE (Quassia Family)

Ailanthus altissima (Mill.) Swingle; Tree-of-heaven (*Ailanthus glandulosa* of Cole). Cole notes that the tree sprouts spontaneously from suckers and from seeds within the City of Grand Rapids; today it is extremely widely distributed in southern Michigan, but seldom collected for the herbarium.

SOLANACEAE (Nightshade Family)

Datura stramonium L. (including *Datura tatula* of Cole); Jimson-weed; 20 Sep 1894 (as *D. tatula*), 10 Jul 1899 (MICH).

Lycium barbarum L. (*Lycium vulgare* of Cole); Matrimony-vine; *H. M. Bailey* s.n., 26 Jun 1892 (MICH); *C. W. Fallass* s.n., 28 May 1882 (ALBC); *M. B. Fallass* s.n., s.d. (MICH); *H. M. Bailey* s.n., 1892 (MICH); *Mulliken* s.n., 29 Jun 1896 (MICH); *Milliken & L. J. Cole* s.n., 29 Jun 1896 (MICH). First collected in Michigan in 1882 in Grand Rapids.

Physalis heterophylla Nees; Clammy Ground-cherry; 6 Aug 1893 (as *P. virginiana*), 3 Jul 1896, 5 Sep 1899 (MICH); *H. M. Bailey* s.n., 29 Aug 1891, 20 Sep 1893 (MICH); *Mulliken* s.n., 24 Jul 1895 (MICH); *Skeels* s.n., 2 Aug 1895 (MSC).

Physalis virginiana Mill.; Virginia Ground-cherry; 2 Jul 1893 (as *P. lanceolata*) (MICH); *H. M. Bailey* s.n., 29 Jun 1892 (MICH); *Mulliken* s.n., 27 Jun 1896 (MICH); *Skeels* s.n., 25 Aug 1895, 29 Aug 1895 (MSC); *Skeels & Shaddick* s.n., 28 Jul 1895 (MSC).

Solanum carolinense L.; Horse-nettle; 5 Sep 1898, 20 Sep 1900 (MICH); *L. J. Cole & Mulliken* s.n., 27 Aug 1895 (MSC); *Mulliken & L. J. Cole* s.n., 27 Aug 1895 (MICH); *Skeels* s.n., 2 Aug 1895 (MSC).

Solanum dulcamara L.; Woody Nightshade, Bittersweet Nightshade, European Bittersweet; *H. M. Bailey* s.n., 3 Jul 1891, 24 Jun 1892 (MICH); *L. J. Cole* s.n., 21 Jun 1893 (MICH); *Mulliken* s.n., 18 Jun 1895, 25 Jun 1895 (MICH); *Skeels & Shaddick* s.n., 19 Jul 1895 (white form), 25 Aug 1895 (both on same sheet, different localities) (MSC); *Sones* s.n., 28 Sep 1889 (MICH). Cole notes this adventive species was already common in swamps and in roadside thickets.

Solanum ptychanthum Dunal (*Solanum nigrum* of Cole); Black Nightshade; 23 Aug 1893 (MICH); *H. M. Bailey* s.n., 28 Jul 1891 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).

Solanum rostratum Dunal; Buffalo-burr; 10 Oct 1900 (MICH); *Mulliken & L. J. Cole* s.n., 6 Jul 1896 (MICH); *Skeels & Shaddick* s.n., 8 Aug 1896, 19 Jul 1900 (MSC).

STAPHYLEACEAE (Bladdernut Family)

Staphylea trifolia L. (*Staphylea trifolia* of Cole); Bladdernut; *H. M. Bailey* s.n., 20 May 1891 (MICH); *C. W. Fallass* s.n., 8 May 1894 (ALBC); *Sones* s.n., 15 May 1889 (MICH).

THEOPHRASTACEAE (Theophrasta Family)

Samolus parviflorus Raf. (*Samolus valerandi* of Cole); Water-Pimpernel, Brookweed; 9 Jul 1894 (as *S. valerandi americanus*) (MICH).

THYMELAEACEAE (Mezereum Family)

Dirca palustris L.; Leatherwood; 16 Apr 1896, 16 Apr 1896 (MICH); *H. M. Bailey* s.n., 23 Apr 1892 (MICH).

ULMACEAE (Elm Family)

Ulmus americana L.; American Elm, White Elm; 17 May 1895, 13 Apr 1898, 27 Apr 1901 (MICH) *Mulliken* s.n., 14 Apr 1896 (MICH).

Ulmus rubra Michx. (*Ulmus fulva* of Cole); Slippery Elm, Red Elm; *H. M. Bailey* s.n., 7 Apr 1892 (MICH); *L. J. Cole* s.n., 15 May 1896 (MSC).

Ulmus thomasii Sarg. (*Ulmus racemosa* of Cole); Cork Elm, Rock Elm.

URTICACEAE (Nettle Family)

Boehmeria cylindrica (L.) Sw.; False Nettle; 25 Jul 1893 (MICH).

Laportea canadensis (L.) Wedd.; Wood Nettle; 28 Jul 1893 (MICH).

Pilea pumila (L.) A. Gray; Clearweed; 20 Aug 1893 (MICH); *M. B. Fallass* s.n., 2 Aug 1893 (MICH).

Urtica dioica L. (*Urtica gracilis* of Cole); Stinging Nettle; 28 Jul 1893 (MICH); *H. M. Bailey* s.n., 7 Aug 1892 (MICH); *Mulliken* s.n., 15 Aug 1897 (MICH).

VALERIANACEAE (Valerian Family)

Valeriana uliginosa (Torr. & A. Gray) Rydb. (*Valeriana sylvatica* of Cole); Swamp Valerian; 20 May 1894 (MICH); *Mulliken* s.n., 2 Jun 1895 (MICH); *Sones* s.n., 13 Jun 1889 (MICH).

Valerianella chenopodiifolia (Pursh) DC.; Goosefoot Corn Salad; 29 May 1897 (ALBC). Apparently rare in Cole's day; Cole noted one "small patch just north of Plaster Creek, between the M.C.Ry. and the G.R.&I Ry. (John Van Splunter), June 1897;" oddly she does not mention the site where her specimen was collected. **THREATENED.**

VERBENACEAE

Phyla lanceolata (Michx.) Greene (*Lippia lanceolata* of Cole); Frog-fruit; *Mulliken* s.n., 12 Jul 1895, 5 Aug 1897 (MICH); *Skeels* s.n., 18 Aug 1895 (MICH); *Skeels & Shaddick* s.n., 18 Aug 1895 (MICH, MSC). Cole noted that this species was rare in Michigan, but was known from along the Grand River (in Grandville and at Plainfield Village) and at Reed's Lake.

Verbena bracteata Lag. & Rodr. (*Verbena bracteosa* of Cole); Prostrate Vervain, Creeping Vervain; *Mulliken* s.n., 2 Jul 1897 (MICH); *Mull[iken] & [L. J.] Cole* s.n., 20 Jul 1896 (MSC).

Verbena hastata L.; Blue Vervain; 20 Jul 1893, 20 Jul 1893 (MICH); *H. M. Bailey* s.n., 15 Aug 1891 (MICH); *Mulliken* s.n., 6 Jul 1895 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896 (MSC).

Verbena stricta Vent.; Hoary Vervain; *L. J. Cole* s.n., 2 Jul 1896 (MSC); *Mulliken* s.n., Jul 1896, 19 Jul 1897 (MICH); *Mulliken & L. J. Cole* s.n., 2 Jul 1896 (MICH); *Skeels* s.n., 21 Aug 1896 (MSC), 21 Aug 1896 (MICH, MSC). Cole states that the locality in the City, where it is "abundant in dumping-ground along Silver Creek," is the only site in Michigan in 1896. The Homer Skeels specimens are from Silver Creek at Division Ave.; Silver Creek is now subterranean in a storm pipe through downtown Grand Rapids. Voss and Reznicek (2012) indicate that few collections were known before 1940, subsequently spreading in disturbed sites of roadsides, along railroad banks and sandy fields.

Verbena urticifolia L. (*Verbena urticaefolia* of Cole); White Vervain; 20 Jul 1893, 23 Jul

1898 (MICH); *H. M. Bailey* s.n., 29 Jul 1892 (MICH); *Mulliken* s.n., 1 Aug 1897 (MICH); *Skeels & Shaddick* s.n., 11 Aug 1896, 26 Aug 1896 (MSC).

VIOLACEAE (Violet Family)

Hybanthus concolor (T. F. Forst.) Spreng. (*Solea concolor* of Cole); Green Violet; 10 Jun 1893, 24 Oct 1894, 1 Jun 1897 (MICH); 22 May 1897, 1 Jun 1897 (MSC); *H. M. Bailey* s.n., s.d. (MICH); *Elsie Lowes* s.n. 25 May 1892 (Herb. Emma J. Cole) (MSC). **SPECIAL CONCERN.**

Viola affinis Le Conte; *Mulliken* s.n., 11 May 1895 (as *V. palmata cucullata*) (MICH).

Viola blanda Willd. (*Viola blanda palustriformis* of Cole); Sweet White Violet; 22 May 1896 (MICH); *H. M. Bailey* s.n., 6 May 1892 (MICH).

Viola canadensis L.; Canada Violet; 9 May 1893 (MICH); *H. M. Bailey* s.n., 2 May 1891, 24 Jun 1892 (MICH); *Mulliken* s.n., 17 May 1897 (MICH); *Shaddick & Fyfe* s.n., 30 May 1896 (MSC).

Viola cucullata Aiton (*Viola palmata cucullata* of Cole); Marsh Violet; 10 Sep 1899 (MICH); 21 Aug 1896 (MSC).

Viola labradorica Schrank (*Viola canina muhlenbergii* of Cole; *V. conspersa* of Voss); Dog Violet; 10 May 1894 (MICH); *H. M. Bailey* s.n., 5 May 1892 (MICH); *Mulliken* s.n., 10 May 1895 (MICH).

Viola lanceolata L.; Lance-leaved Violet; 10 May 1894 (MICH); *H. M. Bailey* s.n., 30 May 1891 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 15 May 1896 (MICH); *Shaddick* s.n., 20 May 1901 (MSC); *Wheeler* s.n., May 1895 (ALBC).

Viola macloskeyi F. E. Lloyd; Smooth White Violet; 10 May 1894 (as *V. blanda*) (MICH); *Mulliken* s.n., 21 May 1894, 21 May 1895 (MICH).

Viola palmata L.; Wood Violet; 10 May 1894 (MICH); *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 13 May 1897, 13 May 1897 (MICH); *Skeels* s.n., 8 May 1895 (MSC); *Skeels & B. E. Livingston* s.n., 29 Aug 1897 (MSC).

Viola pedata L.; Bird-foot Violet; 20 May 1894 (MICH); *H. M. Bailey* s.n., 28 Jun 1892, 22 May 1893 (MICH); *L. J. Cole* s.n., 26 May 1897 (MSC); *Mulliken* s.n., 26 May 1897 (MICH); *Mulliken & E. J. Cole* s.n., 11 May 1895 (MICH); *Shaddick* s.n., 3 May 1899 (MSC); *Skeels* s.n., 8 May 1895 (MSC); *Skeels & Shaddick* s.n., 16 Aug 1896 (MSC).

Viola primulifolia L.; Primrose-leaved Violet; *H. M. Bailey* s.n., 20 May 1891 (as *V. blanda*) (MICH). Species not included in the *Flora* and included in Michigan only with some hesitation (Voss and Reznicek 2012).

Viola pubescens Aiton (including *V. scabriuscula* of Cole); Yellow Violet; 8 May 1893, 20 May 1894, 10 May 1901 (MICH); *Mulliken* s.n., 3 May 1895 (MICH); *Shaddick* s.n. 23 May 1897; *Skeels & Shaddick* s.n., 12 May 1895, 23 Aug 1896 (MSC).

Viola rostrata Pursh; Long-spurred Violet; *L. J. Cole* s.n., 15 May 1895 (MSC); *Mulliken* s.n., 10 May 1895 (MICH); *Skeels & Shaddick* s.n., 19 May 1895, 26 Aug 1896 (as *V. canina Muhlenbergia*) (MSC); *Sones* s.n., 10 May 1889 (MICH).

Viola sagittata Aiton (*Viola ovata* of Cole); Arrow-leaved Violet; 10 May 1894, 6 May 1899 (MICH); *E. J. Cole* s.n., 6 May 1899, 3 Jun 1899 (as *V. fimbriatula*) (MSC); *L. J. Cole* s.n., 15 May 1895, Sep 1895 (as *V. ovata*) (MSC); *C. W. Fallass* s.n., 19 May 1894 (ALBC); *Mulliken* s.n., 7 May 1896, 6 May 1899 (MICH); *Skeels & B. E. Livingston* s.n., 29 Aug 1897 (MSC); *Wheeler* s.n. 15 May 1895 (MSC).

Viola sororia Willd.; Common Blue Violet; *Skeels* s.n., 8 May 1895 (as *V. sagittata*) (MSC); 10 May 1895 (as *V. palmata cucullata*) (MICH); *H. M. Bailey* s.n., 19 May 1899 (MICH).

Viola striata Aiton; Cream Violet; *E. J. Cole* s.n., Oct (no year) (MICH); *C. W. Fallass* s.n., 28 May 1892 (ALBC); *Mulliken* s.n., 11 May 1895 (MICH).

Viola tricolor L.; Johnny-jump-up. Cole notes: "Straying more or less from gardens and becoming depauperate and small flowered." It is presently encountered occasionally in disturbed sites; although this species is included in Cole's *Flora*, it was not documented for Kent County by specimens until 2015 (*Leisman & Crow EC-15-689*, *Leisman & Van Staaldin* *EC-15-743* CALVIN, MICH).

VITACEAE (Grape Family)

Parthenocissus quinquefolia (L.) Planch. (*Ampelopsis quinquefolia* of Cole); Virginia Creeper, Woodbine; 15 Jul 1895 (fl., fr.) on same sheet as 20 Sep 1901 (MICH).

- Parthenocissus inserta* (A. Kern.) Fritsch (*Ampelopsis quinquefolia vitacea* of Cole); Thicket Creeper; C. W. Fallass s.n., Jul 1895 (ALBC); M. B. Fallass s.n., 15 Jul 1895 (MICH).
- Vitis aestivalis* Michx. (*Vitis bicolor* of Cole); Summer Grape; 10 Jun 1895 (MICH); Skeels & Shaddick s.n., 6 Sep 1896 (MSC).
- Vitis riparia* Michx. (*Vitis vulpina* of Cole); River-Bank Grape; Jun 1893 (ALBC); 15 Jun 1872, 10 Jun 1892, 12 Jun 1897 (as *V. bicolor*) (MICH); Skeels & Shaddick s.n., 23 Aug 1896 (MSC).

**JOE PYE, JOE PYE'S LAW, AND JOE-PYE-WEED:
THE HISTORY AND EPONYMY OF THE COMMON NAME
JOE-PYE-WEED FOR *EUTROCHIUM* SPECIES (ASTERACEAE)**

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ABSTRACT

Published accounts have differed greatly with regard to the origin of the common name Joe-Pye-weed, which is applied to *Eutrochium* spp. (Asteraceae: Eupatorieae). Discrepancies have long existed as to the race of the man for whom Joe-Pye-weed was named, the century and the part of the country in which he lived, and even whether the plant name was derived from the name of any person, real or fictional. Our investigation has indicated that this plant name is from the cognomen of Joseph Shauquethqueat, an 18th- and early 19th-century Mohican sachem, who lived successively in the Mohican communities at Stockbridge, Massachusetts, and New Stockbridge, New York.

KEYWORDS: *Eutrochium*, common name, Joe-Pye-weed, Shauquethqueat

INTRODUCTION

The common name Joe-Pye-weed is applied collectively to a group of closely related North American species in the family Asteraceae, tribe Eupatorieae, historically included in *Eupatorium* L. but now generally segregated as *Eutrochium* Raf., following studies by Schilling et al. (1999) and Lamont (2004). Several other vernacular names have been applied to these plants in the past, but, as noted by Borland (1964), the name Joe-Pye-weed is the only one that remains in common use.

Of the five species of Joe-Pye-weeds currently recognized (Lamont 2006), *Eutrochium maculatum* (L.) E. E. Lamont is the most widespread, and is the most abundant throughout the Great Lakes region, New England, and Atlantic Canada. The most popular species in ornamental horticulture are *E. dubium* (Willd. ex Poir.) E. E. Lamont, which is native primarily to the Atlantic Coastal Plain, and *E. fistulosum* (Barratt) E. E. Lamont (often grown under the incorrectly applied name *Eupatorium purpureum* L.), which is more common as a native species southward.¹

Where individual authors are cited in this study, the punctuation and capitalization of vernacular plant names follow those used, respectively, by those authors.

¹In the nineteenth-century publications cited here, the circumscription of *Eupatorium purpureum* often encompassed more than one of the currently recognized species of *Eutrochium*.

WHO WAS JOE PYE? OR WAS THERE A JOE PYE? STORIES DIFFER

The tenth (1993) and eleventh (2011) editions of *Merriam Webster's Collegiate Dictionary* give 1818 as the year in which the plant name Joe-Pye-weed entered the English language, and give the origin of the name as "unknown." In contrast, many other publications do give an origin for this plant name, some of them very confidently. These statements of its origin, however, vary greatly, even as to whether or not the plants were named for any person, real or fictional. These discrepancies led us to investigate the questions of whether a person named Joe Pye, for whom the plants were named, had in fact existed, and if so, when and where he had lived.

Although the most recent editions of *Merriam Webster's Collegiate Dictionary* give the origin of the name as "unknown," as had their predecessor in 1967, the ninth (1989) edition suggested that the name might have been derived through folk etymology from *eupatory*, an older common name derived from the Latin name of the genus in which these species were included for many years. As words beginning with "tu" are pronounced as though they began with "ch" or "j" in some regional dialects of English, this suggested derivation, with a similar sound being added to a word beginning with "eu-," did not seem implausible, especially since some early botanical publications gave "Joe Pye" or "joepye" as the common name of the plants themselves, rather than the compound "Joe-Pye-weed."

For over a century, wildflower guidebooks have given quite a different etymology. An early example is found in *Nature's Garden*, by Neltje Blanchan (1900), according to whom "Joe Pye, an Indian medicine-man of New England, earned fame and fortune by curing typhus fever and other horrors with decoctions made from this plant." But although many wildflower guides, continuing to the present time, tell more or less similar stories, they do not indicate their sources except occasionally through such wording as "legend has it" or "the story goes."

The popular literature on native plants often associates Joe Pye with "Colonial days" and the "Massachusetts Bay Colony," the latter being a designation applied to eastern Massachusetts north of the Plymouth Colony, and to its English settlers, from 1628 to 1691. The literature on the Colonial period in history-conscious New England is extensive, and quite a few persons of the First Nations who had befriended, assisted, or sought peace with, early white colonists in New England are mentioned by name in that literature. But although some recent publications have attributed spectacular success to Joe Pye's treatment of typhus using the plants that now bear his name, even to the extent of saving an entire colony of early white settlers from being wiped out, in none of the records from the Colonial period had we, as we began this study, found any mention of Joe Pye. If he had been so famous and even revered, as some wildflower guides allege, why, we wondered, did we not find him mentioned in the literature of American history or epidemiology, or in any context other than the eponymy of Joe-Pye-weed?

Over the years, the popular literature on wildflowers has tended to include

more and more supposed information about Joe Pye, but no sources have been cited or otherwise indicated for material that had not appeared in earlier publications. This trend has led to discrepancies, both geographic and chronological. Some authors have said that Joe Pye had lived in western Massachusetts, others in eastern Massachusetts or in Connecticut. Harris (2003) said that Joe Pye was “supposed to have been an Indian herbalist . . . from a Maine Nation, [who] sold medicinal concoctions to settlers [in] the Massachusetts Bay Colony.” Other authors, perhaps attempting to reconcile some of the geographic discrepancies, have portrayed Joe Pye as a traveling salesman, at least one mentioning a horse and wagon. Borland (1964) and Durant (1976), for example, said that he “made the rounds of rural New England in the late 1700’s.” Among the conflicting stories mentioned by Sanders (2003), one said that Joe Pye was from Maine and had traveled around the Northeast peddling medicines about the time of the American Revolution. Other authors, e.g., Westcott-Gratton (2013), have placed Joe Pye in the Carolinas.

Some authors, the first perhaps being Britton (in Britton and Eaton 1916) and subsequently including Greene (1917), Hottes (1931), Donabella (2013), Robertson (2014), and others, have specifically associated Joe Pye with the Pilgrims or (Hussey 1974) with the “first colonists” in New England, that is, with the 1620s. Other authors, as noted above, have placed Joe Pye in the latter half of the eighteenth century, and still others have placed him as late as the nineteenth century.

There have also been discrepancies with regard to the ailments allegedly treated by Joe Pye with the plants that now bear his name (although the term “typhus” was used less precisely in the nineteenth century than more recently), and as to whether he used the leaves and stems of the plants or the roots.

Although many authors on wildflowers and herbs have identified Joe Pye with the First Nations, they have generally not identified him with any specific Indigenous nation. Kavasch (2002), however, noted that “[s]ome say he was a Wampanoag Indian herbalist,” without identifying the “some” to whom he referred. This may have been an assumption that ensued from other authors’ association of Joe Pye with the Pilgrims, as the Wampanoags were the Indigenous people of southeastern Massachusetts in the time of the Pilgrims’ arrival.

Joe Pye was consistently identified as Indigenous in earlier publications, but unanimity on this point ended abruptly in 1990, when Foster and Duke (1990), in the Peterson Field Guide series, stated that Joe Pye had been “a 19th-century Caucasian ‘Indian theme promoter’ who used the root to induce sweating in typhus fever.” Since the publication of this popular work, some authors have repeated this statement with various degrees of emphasis and modification, or have mixed portions of it with other accounts of Joe Pye. Horn et al. (2005), for example, said that Joe Pye had learned about medicinal herbs from Indigenous people and promoted their use, but not that he had been of Indigenous origin himself. In a far cry from earlier portrayals of Joe Pye as a benevolent and revered rescuer of the early colonists, some recent authors have gone so far as to portray him as a traveling Caucasian “snake-oil salesman” (e.g., Cutler et al. 2011) or “medicine showman.” No sources were cited for any of the statements that Joe Pye was Caucasian, and it seems most likely that those published after

1990 are the respective authors' own extrapolations from, or embellishments of, Foster and Duke's account, as is sometimes indicated by the recurrence of the word "theme" or forms of the word "promote." We have found no evidence to support the statements that Joe Pye was Caucasian or that he was a peddler or showman of any kind.

Some recent authors (e.g., Stiefel 1991) have said that Joe Pye was an anglicization of Jopi or Zhopai, which had been the name of an Indigenous medicine-man who had introduced early settlers to the use of this herb. We have also encountered a few publications (e.g., Manos 2004) stating that "jopi" or "zhopai" had been the term for fever, or sometimes more specifically typhus or typhoid fever, in an unspecified Indigenous North American language. In none of these publications were sources cited, and we have found no evidence to support either of these derivations.

Legendary expansion, as it is called, is a phenomenon familiar to folklorists and historians. When stories are retold, details may be added to make an action or event seem plausible, to make or emphasize a point, or merely inadvertently. Scholars, when comparing quotations attributed to the same person or accounts of the same allegedly historic event, tend to suspect that the most concise version is closest to what was actually said or done. More than elaboration and embellishment, however, appears in the history of the Joe Pye stories, as they have come to differ not only in peripheral details but in the alleged basic facts. In recent decades, several authors (e.g., Martin 1984; Sanders 2003; Dickinson et al. 2004) have commented on these conflicting accounts. Silverman (1985) and Coffey (1993), having noted the diversity among stories of Joe Pye that they had encountered, concluded that whether Joe Pye had really existed remained in doubt. During our study, authors of the more recent statements about Joe Pye that differed distinctly from those in earlier literature were contacted, but those who responded were unable to recall or find records of their sources.

EARLY USE OF THE PLANT NAME JOE-PYE-WEED

The earliest publication in which we have found the plant name Joe-Pye-weed or any variant thereof was the second edition of Amos Eaton's *A Manual of Botany for the Northern and Middle States*, published in 1818. Few of the earlier works on the North America flora had included vernacular names for plant species. Exceptions included a paper by Manasseh Cutler (1785) on medicinal herbs native to New England; Hosack's (1811) *Hortus Elginensis*, which listed the native and cultivated plants in the Elgin Botanic Garden, which was within the present bounds of New York City and in which the plant collections emphasized medicinal herbs; Jacob Bigelow's (1814) *Florula Bostoniensis*, which listed the wild plants in the vicinity of Boston; and Barton's (1815) *Florae Philadelphicae Prodromus*, which listed those in the vicinity of Philadelphia. All of these works included common names for species that would now be placed in *Eutrochium*, but in none was the name Joe-Pye-weed or any variant thereof mentioned.

The first (1817) edition of Eaton's *Manual* had included *Eupatorium purpureum* [as applied by Eaton, probably = *Eutrochium fistulosum* and perhaps *E. maculatum* in part, the specific epithet *purpureum* having been misapplied at that time] and *Eupatorium verticillatum* Muhl. [= *Eutrochium purpureum* (L.) E. E. Lamont]. Although this edition gave vernacular names for many of the plant species described, none was given for either of these species. In the 1818 edition, and in his *Botanical Exercises* (Eaton 1820), Eaton gave "purple thoroughwort, or joe-pye" as common names for *Eupatorium purpureum* and "joe-pye's weed" for *E. verticillatum*, without commenting on these names. *Eupatorium maculatum* L. and *E. punctatum* Willd. [= *Eutrochium dubium*] were included without common names. In the third (Eaton 1822) and fourth (Eaton 1824) editions of his *Manual*, Eaton gave the same common names for the species called *Eupatorium purpureum* and *E. verticillatum* and added a footnote stating that "[t]he two species, called joe-pye, (from the name of an Indian) are in common use in the western counties of Massachusetts as diaphoretics, &c. in typhus fever." Eaton noted that Zephaniah Moore, while president of Williams College, in Williamstown, Massachusetts, had ascribed his recovery from a "very alarming fever" to the "liberal and continuous use of a tea made with these plants," but he did not associate Moore with the plant name or with Joe Pye himself.

Eaton would have been familiar with the prevalent practices and local argot in western Massachusetts. He had graduated from Williams College in 1799. He wrote these editions of his *Manual* when he was lecturing on natural history, first at Williams, then elsewhere in western Massachusetts, Vermont, and adjacent New York, and while working as a consultant in geology and botany in those regions (Youmans 1896; McAllister 1941).

The next year, Torrey (1819), in *A Catalogue of Plants, Growing Spontaneously Within Thirty Miles of the City of New-York*, listed, under *Eupatorium*, four taxa that would now be placed in *Eutrochium* and gave the common name Joe Pye's weed for *Eupatorium verticillatum*. Torrey was a friend and former pupil of Eaton's and presumably had obtained the plant name from Eaton or his works rather than from usage near New York City. In 1828, Rafinesque, who at that time was living in Philadelphia, stated in his *Medical Flora* that *Eupatorium* species (incorrectly including *E. perfoliatum* L. as well as *E. purpureum*) were given "the name of Joepye . . . in New England from an Indian of that name, who cured typhus with it." Rafinesque (1828) was the first to state explicitly that Joe Pye himself had employed the plants named for him in the treatment of typhus, but this statement is probably merely an inference from Eaton's work. It was, however, repeated by many subsequent authors, with and without reference to Rafinesque, and sometimes expressed more emphatically (but without the citation of sources), attributing "many marvelous cures" to Joe Pye's treatments, which were said to have led to profound gratitude among the colonists.

In 1829, Hitchcock, in a list of the plants growing without cultivation in the vicinity of Amherst, in central Massachusetts, followed Eaton in using Joe Pye for *Eupatorium purpureum* and Joe Pye weed for *E. verticillatum*. That same year, Dewey (1829), who had taught at Williams College and at the Berkshire Medical Institution in nearby Pittsfield, gave Joe-pye-weed as the common name for *E. purpureum* in a list of the plants of Berkshire County, Massachusetts, in

which Williamstown and Pittsfield are located. (Two other species now placed in *Eupatorium* were called “queen-of-the-meadow.”) In a later publication, Dewey (1840) said that a decoction of the roots of that species was often used in western Massachusetts as a remedy for “gravel” (i.e., kidney stones), and that the plant was “said to have been recommended to the whites by an Indian of the name Joe Pye.” Even this early, Dewey used the phrase “said to” as a disclaimer of certainty with regard to the plant name. He did not mention typhus. His reference to “gravel” was presumably based on information obtained from persons he had met while living in western Massachusetts, and he may have heard of Joe Pye from sources additional to Eaton.

Riddell, of Cincinnati, Ohio, who had been a student of Eaton’s, used the name Joe-pye’s weed for *Eupatorium verticillatum* in 1836, in *A Synopsis of the Flora of the Western States*. In 1841 another Ohioan, John Milton Bigelow, who was familiar with Riddell’s and Torrey’s works, gave Joe pye as one of the common names for *Eupatorium purpureum* in his list of the flora of Fairfield County, Ohio, with notes on its medicinal plants. Both Torrey (1843), in *A Flora of the State of New-York*, and Lee (1848), in a list of New York’s medicinal plants, gave the name Joe Pye weed for plants that they identified as *Eupatorium purpureum*. (Torrey had done some taxonomic “lumping” since his earlier work was published.) Torrey’s comments on the eponymy of the plant name and the use of these plants in treating “gravel” were similar to those of Dewey (1840). In 1849, Williams, in a list of the medicinal plants of Massachusetts, gave the common names Jopi root, purple boneset, and gravel root for *E. purpureum*. Except for the unexplained difference in spelling, Williams’ explanation of the name Jopi was similar to that given by Rafinesque (1828), to whose work he frequently referred.

The plant name Joe-Pye weed was used in all of the editions of Gray’s *Manual of Botany*, starting with the first (Gray 1848). Gray, at Harvard University in Cambridge, Massachusetts, was familiar with the works of Eaton, Torrey, and Dewey. Following its appearance in Gray’s widely used and influential works, the name Joe-Pye-weed (with the hyphenation varying) was included with increasing frequency in floras and botanical textbooks intended for use in northeastern North America and beyond. But although Tuckerman and Frost in 1875 included this name in their list of the wild plants found near Amherst, Massachusetts, Robinson’s flora of Essex County, in northeastern Massachusetts, published in 1880, gave common names for most of the vascular plants listed but none for *Eupatorium purpureum* (the only species included that is referable to *Eutrochium*). Although by that time the name Joe-Pye-weed had been widely dispersed in print, its common, everyday use may still have been largely limited to western Massachusetts.

In popular wildflower guides, the use of the name Joe-Pye-weed is as old as the genre itself in North America. In *How to Know the Wild Flowers*, which is considered to have been the first field guide to North American wildflowers, Frances Theodora (Mrs. William Starr) Dana (1893) wrote that “Joe Pye is said to have been the name of an Indian who cured typhus fever in New England by means of this plant.” (As in Dewey’s work, a disclaimer is included.) A few years later, similar wording, but with the qualification relocated, appeared in

Alice Lounsberry's (1899) *A Guide to the Wild Flowers*, in which the author said that Joe-Pye-weed "received its quaint name from a New England Indian who is said to have cured typhus fever by its use." In *Field Book of American Wild Flowers*, another early "classic," F. Schuyler Mathews (1902) omitted the disclaimer, stating that Joe-Pye-weed had been named "for a New England Indian who used the plant in some concoction for the cure of fevers." This was the first use of "concoction," a term that indicates a mixture of ingredients and often, at least nowadays, has disparaging implications. Later authors would repeat this term. Such field guides, as well as other books and magazine articles on native plants that tell a similar story about Joe Pye, have since become numerous. The selection of those to be cited here has concentrated on works that included especially detailed accounts of Joe Pye or statements markedly at variance with those in earlier publications, those that are especially well known, and those that appear to have influenced subsequent authors directly.

JOE PYE'S LAW

A phenomenon familiar to historians, as expressed by Berland (1990), is that "[a]ny anecdote worth telling about one historical personage is equally applicable to any other personage of equal or comparable status." That is, a story, with or without a basis in fact, originally told about one notable person may, over time, become associated with other individuals with comparable positions in history. According to Berland, who did not indicate his source, this has been called "Joe Pye's law," although we have not encountered the term except as used by him. Conversely, different anecdotes originally told, respectively, about several individuals may later become associated with one especially renowned person. Such tendencies probably account for some of the disparate tales of Joe Pye. The association of Joe Pye with a "Maine Nation" may have been derived from earlier accounts actually of Samoset, an Abenaki sagamore from what is now Maine. In the spring of 1621, Samoset, who had been visiting a Wampanoag counterpart in what is now the vicinity of Plymouth, Massachusetts, had greeted the Pilgrims at their settlement and had helped them to survive in their new home and to live in peace—for a time—with the Wampanoag people in that area. The identification of Joe Pye himself with the Wampanoags may have been derived from accounts actually of Tisquantum, also known as Squanto, a member of the Patuxent band of the Wampanoag confederacy, known to history for his assistance to the Pilgrims after their first winter. A story in which Joe Pye was said to have lost favor because he became so obsessed with the plants now called Joe-Pye-weed that he prescribed their use for every ailment, whether or not it brought any relief, may have evolved from hazy recollections of stories about John Tennent, an early Virginia physician who allegedly became obsessed with the supposed healing powers of Seneca snakeroot (*Polygala senega* L.). Some persons have pretended to be of Indigenous North American descent for diverse reasons, such as enhancing their credibility as actors, writers, or activists for environmental causes, a well-known example being the Canadian conservationist

Archibald Belaney, alias Grey Owl. The story of such an individual might, through an expression of “Joe Pye’s law,” have contributed to allegations, further discussed below, that Joe Pye was Caucasian.

Traveling salesmen for dubious nostrums were numerous in late nineteenth-century America, and they sometimes claimed arcane knowledge of herbal medicines employed by people of the First Nations, either through their own heritage or through a special relationship with an Indigenous healer. Some impersonated Indigenous persons or employed such impersonators in their troupes. Some peddler, might, as an aid to sales, have attributed the origin of his own nostrum to the (supposed) medicine-man Joe Pye. Although we have found no definite evidence of this, such a peddler, long after he had moved on, might himself in some locality have become linked in memories with the legendary Joe Pye himself.

According to DeVries (2016), who cited no source, “[i]t was in 1893 that Joe Pye cured the people of New England.” Being aware that Eaton had used the plant name Joe-Pye-weed in 1818, DeVries postulated that, after the plant name had come into use, an itinerant medicine salesman might have taken the name “Joe Pye” as a pseudonym. Such an action might explain some of the stories of Joe Pye as a nineteenth-century traveling salesman. We have not, however, found any supporting evidence that anyone, Indigenous American impersonator or not, adopted the name Joe Pye subsequent to its application to the plants. Perhaps more likely, the date might have resulted from someone’s having misread a reference to Dana (1893).

SPECK AND DODGE CONSULT “CATNIP BILL”

The first persons to attempt a scholarly investigation of the Joe Pye stories were Frank G. Speck, a professor of anthropology at the University of Pennsylvania, whose research specialty was the Algonquian and Iroquoian peoples of northeastern North America, and Ernest S. Dodge, a historian and ethnologist who was the director of the Peabody Museum of Salem (Speck and Dodge 1945). Salem is on the northeastern coast of Massachusetts, and Speck’s family had a summer residence in nearby Gloucester.

In their search for the surname Pye in literature on the Indigenous people of the northeastern United States, Speck and Dodge found from the journal of the Rev. Samson Occom, which was excerpted by Love (1899) and later published in full, with extensive annotations, by Brooks (2006), that a Mohican known as Joseph Pye, a member of the First Nation community known to themselves and others at the time as the Stockbridge Indians, had lived in the 1780s. Occom himself was a Mohican who had been ordained a Presbyterian minister and who became one of the most successful Christian evangelists among the Indigenous people in the northeastern United States. He is perhaps best known to history for his association with Eleazar Wheelock, the founder of Dartmouth College, initially as Wheelock’s student and protégé, and later for a fund-raising tour of Britain on Wheelock’s behalf in 1766 and 1767.

After his association with Wheelock had ended acrimoniously, one of the rea-

sons being that Wheelock's use of the funds raised differed from what Occom had been led to expect, Occom lived for a time on Long Island, then returned to the Mohican community in Connecticut. From there he traveled extensively in the northeastern United States and, beginning in 1785, spent considerable time at the Mohican communities in New York, as will be discussed below (Jones 1854; Love 1894, 1899; Brooks 2006).

In his journal entry for July 14, 1787, Occom wrote: "Some [time] in the morning went to see Joseph Pye, alias Shauqueathquat [sic], and had very agreeable [sic] conversation with him, his wife & another old woman about their Heart Exercises, and they asked some questions and I answered them, and after a while I went back." Although Occom was, at times, a practitioner of herbal medicine as well as a clergyman and teacher, other writings by him indicate that this entry referred to hearts in a metaphorical sense, the "exercises" being a part of the routine in seeking God's forgiveness from sin (Love 1899; Brooks 2006). Occom's journal contains no further mention of Joseph Pye.

Speck and Dodge, having seen at least portions of Occom's journal, knew that Occom had visited Shauquethqueat (the latter's own usual literation) and his family when they were living in New York. They also knew that the Stockbridge people had lived in New York State and that they included not only the original Mohican contingent, but also people from other Indigenous nations who had come from various parts of New England and elsewhere. Speck and Dodge acknowledged that Shauquethqueat might have been descended from ancestors who had lived in Massachusetts, but they did not say, and appear not to have known, that he had lived in Massachusetts himself. (Evidence that Shauquethqueat had lived in Massachusetts is presented below.)

Passages in Speck and Dodge's paper suggest a presupposition that associated Joe Pye with the seventeenth century and Atlantic coastal Massachusetts. This was not explained, but may have resulted from their having seen publications such as Britton and Eaton (1916), in which Joe Pye had been associated with the Pilgrims. Not having found evidence to connect Shauquethqueat directly with Massachusetts, where they believed that the plant name had originated, they doubted that Joe-Pye-weed had been named for him. Also, although they had found no published use of the plant name Joe-Pye-weed or any variant thereof earlier than Rafinesque (1828), Speck and Dodge believed that the plant name had been in existence too long, and that its use had become too widespread, for the plants to have been named for someone who had been living in 1787.

Speck and Dodge, therefore, sought evidence that would unequivocally connect an eponymous Joe Pye with Massachusetts. In this pursuit they asked William A. P. "Catnip Bill" Luscomb what he knew about Joe Pye. Luscomb was a lifelong resident of the Salem–Gloucester area whom they identified as "an herb-gatherer and itinerant Indian 'doctor,'" and who they believed was in his 80s when they interviewed him shortly before 1945. Speck and Dodge, who had anthropologists' interest in and respect for the oral transmission of tribal history, knowledge, and folklore, believed that Luscomb was "of Indian extraction" and represented a people with a long orally transmitted heritage. Luscomb told them that, many years earlier, his father, who had also been an "herb-doctor," had told him that Joe Pye had been "an Indian medicine-man who [had] lived near Salem

in colonial times,” where he had owned a large tract of land, that he had “taught the settlers to use ‘Joe Pye weed’ to cure fever,” and that he had moved away—to western Massachusetts, Speck and Dodge assumed—after the white settlers whom he had befriended had “crowded [him] out of his land” near Salem.

Speck and Dodge apparently assumed that the story of Joe Pye, as recounted by Luscomb, had been transmitted from generation to generation among the Indigenous people of eastern Massachusetts since early Colonial times, but it is doubtful that the significance they accorded this story was justified. Luscomb, as Speck and Dodge themselves recognized, was an eccentric and talkative “character,” who, judging from recollections by those who had known him (Lefavour 2014), was likely to come up with a story whenever an opportunity arose. Massachusetts birth records indicate that, rather than having been in his 80s when Speck and Dodge interviewed him, he was actually about 70 years old. According to U.S. census records, his father had worked in a glue factory, and we have found no indication that he had practiced herbal medicine. Recollections by others (as recounted in Lefavour 2014), some of which go back to the 1940s, are of Luscomb only as a grower and peddler of catnip. Neither in these recollections nor in the resources at the Beverly Historical Society (Luscomb spent his later years in Beverly, Massachusetts, near Salem) is there any mention of his having been an “herb-doctor” or of Indigenous ancestry. Whether Luscomb really had heard anything about Joe Pye from his father, who had died in 1902, and if so, how accurate his recollection was, could not by that time be investigated.

Speck and Dodge accepted Luscomb’s story as an indication, at least, that “old Salem [was] a center from which the fable may have spread.” Aside from their apparent presuppositions, Luscomb’s story appears to have been Speck and Dodge’s only basis for their associating either Joe Pye himself or the origin of the plant name Joe-Pye-weed with the northeastern coastal region of Massachusetts or with a period earlier than the late eighteenth century. Neither Eaton’s (1822) nor Dewey’s (1840) works, both of which had indicated that the plant name was first used in western Massachusetts, was cited by Speck and Dodge.

Luscomb’s story reinforced Speck and Dodge’s doubt that Joe-Pye-weed could have been named for the Joseph Pye of the 1780s, especially if, as they believed, that Joseph Pye had lived in New York. They postulated instead that that Joseph Pye might have been a descendant, perhaps a grandson, of an earlier Indigenous American herbalist in the Salem area, likewise known as Joe Pye, for whom the plants had been named. They acknowledged, however, that in their search of the published histories of Salem and Essex County, as well as Robinson’s (1880) flora of Essex County, they had found no record of any such person. Hendrickson (2008) summed up Speck and Dodge’s conclusion by saying that “the original Salem, Massachusetts, healer . . . has not yet been unequivocally identified.”

Following Speck and Dodge’s study, other authors on wildflowers quickly picked up on this putative association of Joe Pye with Atlantic coastal Massachusetts, sometimes specifically with Salem and some including details from Luscomb’s story. This seems to have led to further speculation and assumptions. Salem had been an early site of English colonization and had long been, and through folklore and literature continues to be, associated in the public mind

with the Puritans and events of the seventeenth century. Stories of Indigenous people in what is now eastern Massachusetts befriending the early colonists and rescuing them in times of hardship are likely to recall tales of the Pilgrims at Plymouth, farther south along the Massachusetts coast. Because of the prominence of the early Colonial period in popular concepts of Massachusetts history, references to an unspecified but supposedly distant past in Massachusetts may become associated in people's minds with that period. Such assumptions, whether made before or after Speck and Dodge's paper was published, probably contributed to the association of Joe Pye with the early Colonial period and coastal Massachusetts.

Other than Luscomb's story, which we consider to be unreliable, we have found no evidence to support the association of Joe Pye with the vicinity of Salem, Massachusetts, or with the seventeenth or early eighteenth century. Since the earliest published use of the plant name that we have found dates from 1818, it seems plausible that the plants could well have been named for someone who had been living as late as 1787. We have, moreover, found that Shauquethqueat, also known as Joseph Pye, had lived in western Massachusetts, from which region the plant name was first recorded. We therefore consider Speck and Dodge's postulated history of the plant name Joe-Pye-weed to be improbable and their dismissal of Shauquethqueat as a likely eponym of the plant name to have been unjustified. A similar conclusion was reached by Brooks (2006), who explicitly identified the Joseph Pye of Occom's acquaintance as the "namesake of the 'Joe Pye' weed."

SHAUQUETHQUEAT

Occom's identification of Joseph Pye with Shauquethqueat has been valuable to us in locating information on this individual, as he preferred to use the name from his ancestral tradition and generally identified himself in formal contexts as Joseph Shauquethqueat. We have found records, presented below, of several events in Shauquethqueat's life, indicating something of his role in the Stockbridge Mohican community.

By the late seventeenth century, the Mohicans, whose original homeland had been the Hudson Valley and western New England from the Catskills to the southern end of Lake Champlain, had become depleted in numbers by epidemics and by wars with other Indigenous nations and were under increasing pressure from white settlers to give up their lands in Connecticut and downstate New York. In the 1730s and 1740s, although some remained in Connecticut, the Mohicans concentrated much of their population in western Massachusetts, in and around the village of Stockbridge. This area had been set aside by the General Court (i.e., the legislature) of Massachusetts, initially envisioned as an experiment in Indigenous and white cooperation, and subsequently further justified as a reward for the Mohicans' service on the British colonists' side in intercolonial conflicts with the French. Those who migrated to Massachusetts were joined by Munsees and people of other First Nations, and developed an identity distinct

from those in Connecticut. They now identify themselves as the Stockbridge-Munsee Band of the Mohican Nation (Jones 1854; Frazier 1992; Miles 2015; History Files 2017).

These Mohicans were predominantly Christian, many having adopted that religion during visits by missionaries from several denominations, and others having done so when the resident missionary John Sergeant, Sr., came to Stockbridge in 1734. Many of the Mohicans had adopted biblical first names upon becoming Christians, and their children and descendants were usually given such names at birth. Surnames identical to or resembling those of English-speaking persons were also adopted by the people of many Indigenous North American nations, often at the urging of white missionaries, or in later years were imposed upon them by government agencies. These surnames facilitated dealings with whites, being easier for the whites to remember and spell and being indicative of family relationships, but among people of their own Indigenous nations, many continued concurrently to use names from their ancestral tradition.

According to the genealogical website MyTrees (2016) and Mohican genealogical records excerpted and discussed by Siemers (2009), Joseph Shauquethqueat, a.k.a. Joseph Pye, was born in 1722. His father was Benjamin Kokhkewenaunaunt, who was called “King Ben,” a Mohican sachem who had three sons, of whom Joseph was the eldest, and one daughter. Since Kokhkewenaunaunt moved to Stockbridge in the 1740s (Frazier 1992), it is probable that Shauquethqueat was born in Connecticut, near the Thames River, where his father is known to have lived prior to his moving to Stockbridge.

The surname Pye has long existed among English-speaking people, and was already in use among the Mohicans in Connecticut by the 1730s or earlier, variously spelled Pey, Pie, Py, and Pye in the early years (De Forest 1851; Talcott 1896). The papers of Joseph Talcott, colonial governor of Connecticut from 1724 to 1741, include a letter from Benjamin Uncas and 58 other members of the Mohican community in Connecticut, dated August 2, 1737, informing the governor that they had accepted Uncas as their sachem. Among those who signed, most of them using distinctive marks, were persons identified as “Jo Pey” and “Jo Pey Jun^r.” by the witness who attested to their identity. Subsequent correspondence in the Talcott papers, dated 1738/39 (providing for the transition from Old Style to New Style calendars), was signed with a mark attributed to “Jo Pie” [sic], with no indication of his generation. In the papers of Talcott’s successor, Jonathan Law (Connecticut Historical Society 1907), correspondence from the Mohicans dated 1742 and 1743 is signed with marks attributed to “Old Jo Py,” “old” in this context presumably meaning “senior,” and in the last of this correspondence, dated 1745, to “Joseph Pie.” There is no mention of “Jo Py Junior” later than 1737.

How these documents relate to the story of Shauquethqueat is uncertain. None of the council members who signed this correspondence is unequivocally identifiable as Benjamin Kokhkewenaunaunt. Speculation that Joe Pye Junior was Shauquethqueat and Old Joe Pye was his father would require the corollary that Benjamin Kokhkewenaunaunt changed his Anglo-Christian name upon moving to Stockbridge. Moreover, in August 1737 Shauquethqueat would have been about 15 years old, very young for a tribal councilor or a participant in

communication with the governor, even if his leadership potential was recognized at an early age. An alternative hypothesis is that the two individuals mentioned in the Talcott and Law papers were other members of the Mohican nation who shared the surname Pye, perhaps members of Shauquethqueat's extended family, although it might be considered unlikely that any additional person would take or be given the name Joe Pye when other members of the Mohican community already bore that name. If the premise is accepted that the plant name Joe-Pye-weed originated in western Massachusetts, it should be noted that, as indicated by sources cited above, the English-speaking people in western Massachusetts during the mid- and late eighteenth century knew only one of their Indigenous neighbors as Joe Pye, and that was Shauquethqueat.

The signatures attributed to "Old Jo Pie" have no evident connection to much later uses of "old" in literature on the plant name Joe-Pye-weed. Jaeger's (1945) reference to Joe Pye as "an old medicine man" when he first encountered English colonists probably reflects a subconscious image of a man who had attained a venerated status among his people. Occasional references to "old Joe Pye" (e.g., Shaw 1911; Borland 1964) probably reflect the authors' association of Joe Pye with times long past, as such a usage of "old" is not uncommon, rather than to his supposed age when he encountered white settlers. References to the plant itself as "old Joe Pye" (e.g., Lounsbury 1899) are probably a literary stylization, combining personification—applying the man's name to the plant—with an intensive related to the authors' long-time familiarity with the plant, in combination with its commonness and coarse aspect, and/or perhaps to its association with a man of long ago.

The earliest record of activities by Joseph Shauquethqueat that we have found dates from May 25, 1757, when he witnessed a document related to a transfer of land from Rhoda Poncoat and Mary Fast Case to Matteus van Guilder (Winchell 2001). At that time he was living in Stockbridge. In 1774, after Ms. Poncoat's death, he was called upon to testify to the authenticity of this document. His name next appears in the records of Isaac Marsh, who would later be one of the captains of the Stockbridge Indian Militia during the American Revolution, but who, in 1775, was operating a tavern in Stockbridge. On July 26 of that year Marsh charged Joe Pye 1 shilling/6 pence for a quart of rum. Similar charges and two cash advances appear later in Marsh's records for that year. In 1782 Marsh credited one hat and a bushel of wheat received from Joe Pye toward settling his account. In 1789, by which time Shauquethqueat had moved to New York, Joe Pye was still listed among Marsh's debtors (Borland 1964; Edsall 1984; Bulkeley and Bulkeley 2004).

Records of the Massachusetts Anti-Slavery and Anti-Segregation Petitions (1781) show that, from March through June 1781, Governor John Hancock and the Massachusetts legislature received a series of petitions from Joseph Shauquethqueat and other Stockbridge Mohicans, and from Asa Bement, Isaac Ball, and other white millers, requesting confirmation that Shauquethqueat et al. had held title to potential mill sites in Stockbridge and had legally been able to convey those properties to the millers.

During the Town of Stockbridge's early years, both races were represented on the Board of Selectmen, and Shauquethqueat was elected a selectman in 1777

and again in subsequent elections (Jones 1854; Frazier 1992). About 1777, Shauquethqueat also became Chief Sachem of the Stockbridge Mohicans (Frazier 1992; Miles 2015).²

Service on the pro-independence side in the American Revolution, and especially the loss of many of their men in the Battle of Kingsbridge, had greatly exacerbated the hardships of the Stockbridge people. In February 1780 Shauquethqueat, with other spokesmen for the Stockbridge Mohicans, sent a petition to the General Court of Massachusetts “praying that some Way be provided by which they may be enabled to procure Clothing.” The *Resolves of the General Court of the Commonwealth of Massachusetts*, April 1780 session, Chapter 82, state that the General Court had granted a petition from Joseph Shauquethqueat, Benjamin Wauchnauwet, and David Naunauneck to sell certain tracts of Mohican land to white purchasers named in the resolve, “any act or law of this State to the contrary notwithstanding.” In 1781 and 1782, after the conflict between the British and American forces had ceased, the Stockbridge Mohicans, who had continued to suffer from depleted resources and white encroachment, petitioned the governments of New York and Vermont for grants of land in reward for their service during the war. Shauquethqueat reminded the recipients of these petitions not only of the Mohicans’ service in the war but also that “[w]e and our fathers had once been the rightful possessor of all your Country,” and that they had not been compensated for much of the land that they had lost (Calloway 1995).

In 1785, the Stockbridge Mohicans, impoverished and having succumbed to pressures to sell much of their land in Massachusetts or surrender it in settlement of debts, and with their civil rights in Stockbridge being eroded as the white population increased, began an exodus to what is now part of Madison and Oneida counties, New York. They had been granted land there by the Oneidas, whom the Mohicans had assisted in their struggles against the Mohawks and with whom they had been allied on the pro-independence side during the American Revolution (Hammond 1872; Love 1894, 1899; Frazier 1992; Miles 1994). From time to time they were joined by Munsees and others from linguistically kindred Indigenous nations that had likewise embraced Christianity. In New York, the Mohicans and those who had joined them established the towns of New Stockbridge (now Stockbridge, New York) and Brothertown, the latter of which was settled primarily by Munsees from New Jersey, about 20 km distant from each other, northeast of present-day Oriskany Falls.

On July 2, 1783, after the war had ended but before George Washington had resigned as commander-in-chief of the American forces, Shauquethqueat (1783), as Chief Sachem of the Mohicans in Stockbridge, Massachusetts, sent a message to Washington, who was still at his Revolutionary headquarters in Newburgh, New York, informing him that he was preparing a delegation, consisting of the Chief Warrior and four other Warriors, to meet with their “great Brother” whom they had served during the war. Captain Hendrick, the Chief Warrior, would inform Washington as to their welfare and present their request. In response, Washington issued a certificate of allegiance to safeguard the Stockbridge Mo-

²On the traditional role and status of a Mohican sachem, see De Forest (1851) and Jones (1854).

hicans on their migration to New York, stating they had “remained firmly attached to us, [and had] fought and bled by our side.” White settlers, who might have assumed that the Stockbridge Mohicans were hostile, were assured by Washington that they were not and were advised “not to molest them in any manner whatever, but to consider them as friends and subjects to the United States of America” (Frazier, 1992).

Probably early in 1787, Shauquethqueat, accompanied by his wife and sister, joined the other Stockbridge Mohicans in New York (Brooks 2006). There he was one of the signatories to a letter dated August 29, 1787, asking Occom to serve as their minister. Although Occom had frequently visited the New York communities, as when he visited Shauquethqueat in July of that year, he was at that time still based in Connecticut. In November 1787, Shauquethqueat was one of those who signed a plea “to all benevolent gentlemen” seeking financial support for Occom’s ministry, which plea Occom and two others took to New York City and several locations in New Jersey and Pennsylvania. Occom moved to New York State in the spring of 1789 (Love, 1894, 1899; Brooks, 2006).

Shauquethqueat was one of the two Mohican sachems in New York State, the other being Hendrick Aupaumut (sometimes identified as Captain Hendrick, as in the letter to Washington, since he had attained that rank in the Stockbridge Militia during the American Revolution). While in New York the Stockbridge leaders pursued settlement of their claims against the federal government related to their service in the Revolution, made several requests for aid from the federal and New York State governments, and entered into agreements with respect to lands.

When the Mohican municipality in New York was organized in May 1793, the adult male inhabitants chose “three men as peacemakers whose business it was to attend to all matters of difficulty arising between any of the Inhabitants of said Town &c.” (J. Sergeant, Jr., diary entry for May 7, 1793, quoted by Miles 2015). According to Miles, “[t]he first peacemakers were probably the Chief Sachem, Joseph Shauquethqueat (Pye), Chief Joseph Quinnaquant (Quinney), and his son, Counsellor John Quinney.” Miles (2015) noted further that “[t]he important role of peacemakers to settle disputes,” established at that time, “continues to this day and is codified in the current constitution of the Mohican Nation.”

Although the Mohican land in New York had been granted by the Oneidas rather than by the state, their land in Vermont had been granted by the state. In 1789 the Vermont land was sold to Isaac Marsh. One account says that the land was sold for £140; another that it was received by Marsh in full settlement of debts (presumably including the longstanding debt of Joe Pye, noted above). These versions are not incompatible, as white speculators encouraged Indigenous people to run up debts as a means of obtaining title to their lands in payment thereof. Joseph Shauquethqueat had been the first-named of the twenty Stockbridge Mohicans to whom the grant had been chartered by the Vermont General Assembly, and he was one of the eighteen from New Stockbridge and Brothertown who signed the agreement with Marsh. This tract later became the Town of Marshfield, Vermont (Frazier 1992; Calloway 1995; Bulkeley and Bulkeley 2004; Kent 2005). About the same time, as the migration to New York

approached completion, the Stockbridge Mohicans arranged with trusted white friends in Massachusetts for their remaining land in Stockbridge to be sold.

Subsequently, Mohican land in New York was also sold. When Solomon Perkins came from Maine in 1792 seeking good farmland, he was shown land that the Stockbridge and Brothertown people were willing to sell by a man identified as Captain Pye (Hammond 1872). In view of the time and place, it is probable that this was Shauquethqueat. White persons of the time often used the honorific “Captain” when referring to First Nations chieftains, whether or not it had formally been bestowed.

The Rev. Elkanah Holmes, a Baptist clergyman much concerned with missions among the Indigenous people in upstate New York and Upper Canada, visited Brothertown in 1797. Following this visit, spokesmen for the Mohicans and other people of New Stockbridge and Brothertown joined with the New-York Baptist Association’s Committee for Indian Affairs in seeking support from the New-York Missionary Society for the Promulgation of the Gospel among the Indians, an interdenominational organization, for further missionary work by Holmes, specifically for a tour of five or six months by Holmes among the Indigenous people of New York. The Mohican leaders encouraged Holmes not only to continue his missionary work among their people, but also to extend his efforts to other Indigenous nations. Their letter to Holmes advised him to let others know that he had the approbation of the Stockbridge Mohicans, and included pragmatic advice on getting along with those whom he might visit, such as, “[t]ake willingly any thing eatable laid before you; you must not manifest any slight or disrelish on account of its not being dressed well.” In another letter to Holmes, with “Joseph Schauquethqueat” [sic], as one of the sachems, being the first of the several signatories, the Stockbridge and Brothertown people expressed their pleasure that Holmes was “willing to take notice of the kindness shown” to his ancestors by theirs. In this letter, the Stockbridge and Brothertown spokesmen said that “you have a council fire at one end of the path [connecting them], and we have ours [at] this end. Let us always keep this path clear.” This letter was accompanied by gifts to Holmes of a belt of wampum and an account of the traditional customs of the Mohicans, which Shauquethqueat and the others recognized were in danger of being forgotten ((Shauquethqueat et. al. 1800; Davis 1800; Crawford 1801).

The Mohicans also received assistance from the Quakers during this period. The extensive correspondence on this subject at Haverford College includes a letter written September 9, 1797, upon the impending departure of the resident Quaker missionary Henry Simmons, expressing thanks for all that the Quakers had done for the Stockbridge and Brothertown people, with Joseph Shauquethqueat as the first of the six signatories. A letter from the Associated Executive Committee of Friends on Indian Affairs, addressed to “Joseph Shauquethqueat, Hendrick Aupaumut, and all others of the Stockbridge Nation” in 1797, relates to three Stockbridge girls who—as desired by the Stockbridge leaders, according to this letter—had been taken into Quakers’ homes in Chester County, Pennsylvania, there to be educated in English and domestic arts until they reached the age of 18.

As time passed, much of the tribal land in New York was acquired by the

State, often through deception, according to Brothertown history. Also, relationships with the Oneidas had deteriorated, as many of the latter had chosen to follow the Seneca leader Handsome Lake, whose religious teachings were based on ancestral Haudenosaunee beliefs, whereas the Stockbridge people remained Christian. In 1808 the people of New Stockbridge and Brothertown were discussing an alliance with the Miamis of Indiana that potentially would mutually strengthen the Indigenous nations. Joseph Shauquethqueat, as a sachem, was one of the three Mohican signatories to a letter to the “western Indians,” as the Miamis were called in this correspondence, dated July 8 of that year. In this letter, the Stockbridge and Brothertown people proposed to send a substantial quantity of “mostly blue” wampum to the Miamis, with the objective of forming a union for “the peace, friendship and happiness of said western Indians, and to confirm a gift of said western Indians of a large country of land to the Stockbridge and Brother Indians, to be thereafter confirmed by the general government” (Andler 2016). Hendrick Aupaumut spent the years 1808 through 1815 with the Miamis in Indiana. In his absence, the Stockbridge Mohicans, and those of the other Indigenous nations who had joined them in New York, were, according to Miles (2015), “ably led by Chief Sachem Joseph Shauquethqueat (Pye), David Neesoonnuhkeek, John Quinney, John Metoxen, Isaac Wnaupey and others.” These plans were disrupted by the Battle of Tippecanoe and the War of 1812, and when about a quarter of the Stockbridge people went to Indiana in late 1818, they found the land occupied by white settlers, having shortly before been ceded to the United States under the terms of the Treaty of St. Mary’s (Hammond 1872; Andler 2016).

In November 1809 the peacemakers granted Joseph Pye the right to have ten pine trees cut on the undivided lands of the Stockbridge Mohicans in New York by whomever he thought fit. This led to the case of Chandler vs. Edson, which came before the Supreme Court of New York in 1812. The legal question was whether Pye had the authority to convey this right to Edson, who was white, without the consent of the state legislature, which had established such an interdiction to protect the Indigenous people from sharp practices by the whites (Johnson 1839). The court ruled against Edson.

It does not appear that Shauquethqueat was present when this case was heard, nor have we found any references to Joseph Shauquethqueat/Joseph Pye after 1809. If 1722 is correct as the year of his birth, he would have been 87 years old in 1809, so it is likely that he did not live long beyond that date. Although he was not among the Stockbridge Mohicans who moved from New York to their new reservation in Wisconsin in the 1820s and 1830s, several people with the surname Pye were among those who did, and some or perhaps all of them were probably members of Shauquethqueat’s extended family.

KEEWAYDINOQUAY’S STORY

Uniquely among the stories of Joe Pye that we have encountered, the story told by Keewaydinoquay (recorded by Geniusz 2013) is attributed directly to

First Nations rather than to white folklore. This story is discussed here, rather than in the first part of this study, because its value as a source of historical information is best assessed in the light of Occom's and others' identification of Joe Pye with the Mohican sachem Shauquethqueat, and the accounts of Shauquethqueat that we have seen in this study.

Keewaydinoquay Pakawakuk Peschel (1919?–1999) was an Anishinaabe herbalist, ethnobotanist, storyteller, and recorder of Indigenous North American lore who had studied at the University of Michigan and who spent much of her life on Garden Island in the Beaver Islands group of northern Lake Michigan, near which she had been born on a fishing boat en route to a hospital. According to her story, which she attributed to the folklore of her own Anishinaabe people, Zhopai was an Abenaki medicine man who had lived in the vicinity of Stockbridge, New York, and who had had great success among the Indigenous people in treating “typhoid” [sic] fever with a preparation made from a *Eutrochium* species in combination with boneset or thoroughwort, *Eupatorium perfoliatum*. When a typhoid epidemic beset a nearby white community, a blacksmith who had befriended and done much for the Indigenous people pleaded with Zhopai to treat his two young sons, who were in danger of death from the fever. In his distress, the blacksmith offered Zhopai anything he possessed, even his farm, if he saved his sons. Zhopai treated the boys and they recovered, and Zhopai declined to accept the blacksmith's farm. Others among the Stockbridge Indigenous people objected to Zhopai's having used knowledge from his Indigenous heritage for the benefit of white people, and when they moved to Wisconsin, Zhopai was told to stay with his white friends and was denied permission to accompany them. Zhopai gave his grandchildren a bag of *Eutrochium* seeds, telling them to sow them on their journey westward, so that, in his next life, he could follow their trail by looking for the plants.

Keewaydinoquay's story is more appealing than the portrayals of Joe Pye as a “snake-oil salesman,” but whether it contributes to our quest for information on the historical Joe Pye is questionable. Keewaydinoquay's objective in learning and communicating stories such as this was the preservation of Indigenous folklore, which she valued for its own sake rather than as a source of historical data. That she learned this story from an Anishinaabe source is thoroughly credible, but when and how the story migrated from New York to Michigan, and from the Stockbridge people to the Anishinaabeg, if indeed it did, is not known. The genesis of a legend can occur at any time in any culture, and this version of the Joe Pye story might have arisen among the Anishinaabeg when they learned that their Caucasian neighbors knew *Eutrochium* as Joe-Pye-weed and that they identified an eponymous Joe Pye as an “Indian medicine man,” and may have incorporated some portions of accounts heard from white persons. The identification of Zhopai as Abenaki is reminiscent of Harris's (2003) version of the Joe Pye story, but, in the absence of known sources, whether this or other similarities are merely coincidental cannot be determined.

In the shorter version of Keewaydinoquay's story presented by Lukes (2011), Zhopai is said to have treated his people “for centuries.” This clearly indicates an input from fantasy in the development of the legend. Even if this component of the story is omitted, as it was by Geniusz (2013), incongruities remain. Signifi-

cantly, the name Zhopai is presented as a literation of the man's name in his Indigenous culture, with no mention of the name Shauquethqueat. Although individuals as well as clans and tribes have migrated throughout human history, the story of an Abenaki man's having lived among the Stockbridge people in New York, well to the west of the Abenaki homeland (from eastern Vermont to the Canadian Maritime Provinces) introduces an element of improbability for which no explanation is given.

The story of Zhopai's ostracization casts further doubt on the historicity of this story. As noted above, Mohican records indicate that Shauquethqueat/Joseph Pye was born in 1722, became a sachem about 1777, and was still a member of the community in 1809, when he was about 87 years old. If this is correct, Shauquethqueat would have been well over a hundred years old when the Stockbridge people were compelled to move from New York to Wisconsin in the 1830s. Even though his father, King Ben, reportedly lived to the age of 104, it is unlikely that Shauquethqueat was living at the time of the migration. To someone who was aware that Stockbridge people with the surname Pye were among those who had moved to Wisconsin, and that Joseph Pye had not been among them, ostracization may have seemed to be a possible explanation. The details in the story of the blacksmith and his sons suggests that it may have had some factual basis, but if so, whether it really was Shauquethqueat who brought about a remarkable cure, or (through an expression of "Joe Pye's law") another Indigenous herbalist who had treated white patients, is not known. We have seen no other version of the Joe Pye legend that mentions this episode.

CONCLUSION

Although other persons, at other times and in other places, have been known as Joe Pye or Joseph Pye, the evidence we have presented above indicates that the *Eutrochium* species called Joe-Pye-weed were named for the Mohican sachem Joseph Shauquethqueat, who was also known, especially among his white neighbors, as Joe Pye. The earliest recorded uses of the plant name Joe-Pye-weed or variants thereof are from western Massachusetts, the area in which Shauquethqueat had lived (Eaton 1818). Eaton, a botanist who himself lived in western Massachusetts, noted that the plant name Joe Pye's weed, and variants, had become established in that area (but apparently not yet elsewhere) by 1818, only 21 years after Shauquethqueat had lived in Stockbridge, and (Eaton 1822) shortly thereafter stated that the plant name was derived "from the name of an Indian." We have found no record of any other person known as Joe Pye having lived in western Massachusetts prior to 1818.

We have found no explicit evidence that Shauquethqueat was a "medicine-man" or "herb-doctor," as Joe Pye has often been said to have been, or that he was a vendor of herbal medicines, itinerant or otherwise. Even if he had been a practitioner of herbal medicine, it is unlikely that such evidence would now exist. Shauquethqueat was acquainted with Samson Occom, who, as indicated in his collected writings (Brooks 2006), was interested in traditional herbal medi-

cines, about which he had been taught by a Montauk man named Ocus in 1754, when he was living on Long Island. According to Brooks, Occom occasionally practiced medicine throughout his life. His posthumously published writings include notes on “herbs and roots” that appear originally to have accompanied something no longer extant, probably a collection of plant specimens. It has sometimes been said that Joe Pye learned the practice of herbal medicine from Occom, but we have found no evidence of this, or of any close association of Shauquethqueat with Occom, in Occom’s writings or elsewhere. Other than what is noted here, the Stockbridge people’s writings that we have seen, and the publications on the Stockbridge people by their white contemporaries, say nothing about herbal medicine and mention no practitioners by name.

The association of Shauquethqueat with Joe-Pye-weed does not require explicit evidence or even the assumption that he was a practitioner of herbal medicine. Most of the Mohican people of his time probably had some knowledge of this subject. Since Shauquethqueat was both a sachem and a selectman in Stockbridge, he would have been well known among the white people living nearby, and it would not have taken many observations of his collecting the plants now called Joe-Pye-weed for medicinal use, or suggestions from him that they use those plants for the treatment of fevers, or merely observations of the plants near his residence, before someone, when referring to those plants, associated them with the man they knew as Joe Pye.

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L’ENVOI

The story of Shauquethqueat presented here is not mere mythoclasy. It is rooted in the history of the Mohican people and is supported by works of the Mohicans’ own authorship, to some of which Shauquethqueat himself contributed. Shauquethqueat was for many years a leader of his people, much concerned about their well-being, and it is appropriate that he should have a place in history.

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THE OCCURRENCE OF THE GREEN ALGA *PRODODERMA VIRIDE* (CHLOROPHYCEAE) IN MICHIGAN

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ABSTRACT

The epiphytic branched filamentous green alga *Protoderma viride* is reported from Michigan for the first time. An alga occurring worldwide, its only other report for the Great Lakes region is from Wisconsin. Using light microscopy it was observed from numerous strata from one Upper Peninsula site and several Lower Peninsula locations.

INTRODUCTION

The widely occurring green algal genus *Protoderma* Kützting has been reported from all seven continents and the Pacific Ocean islands (Burova et al. 2011, Guiry 2016). Of the nine species currently accepted taxonomically (six freshwater, three marine; Guiry 2016) only the species *Protoderma viride* Kützting has been reported from as many as six continents, though it is not known from Antarctica. Considering that it is the most widely distributed species of *Protoderma* (Guiry 2016), it is surprising that it has never been reported from Michigan. The only previous record of its occurrence from the Great Lakes region is from Wisconsin (Prescott 1962).

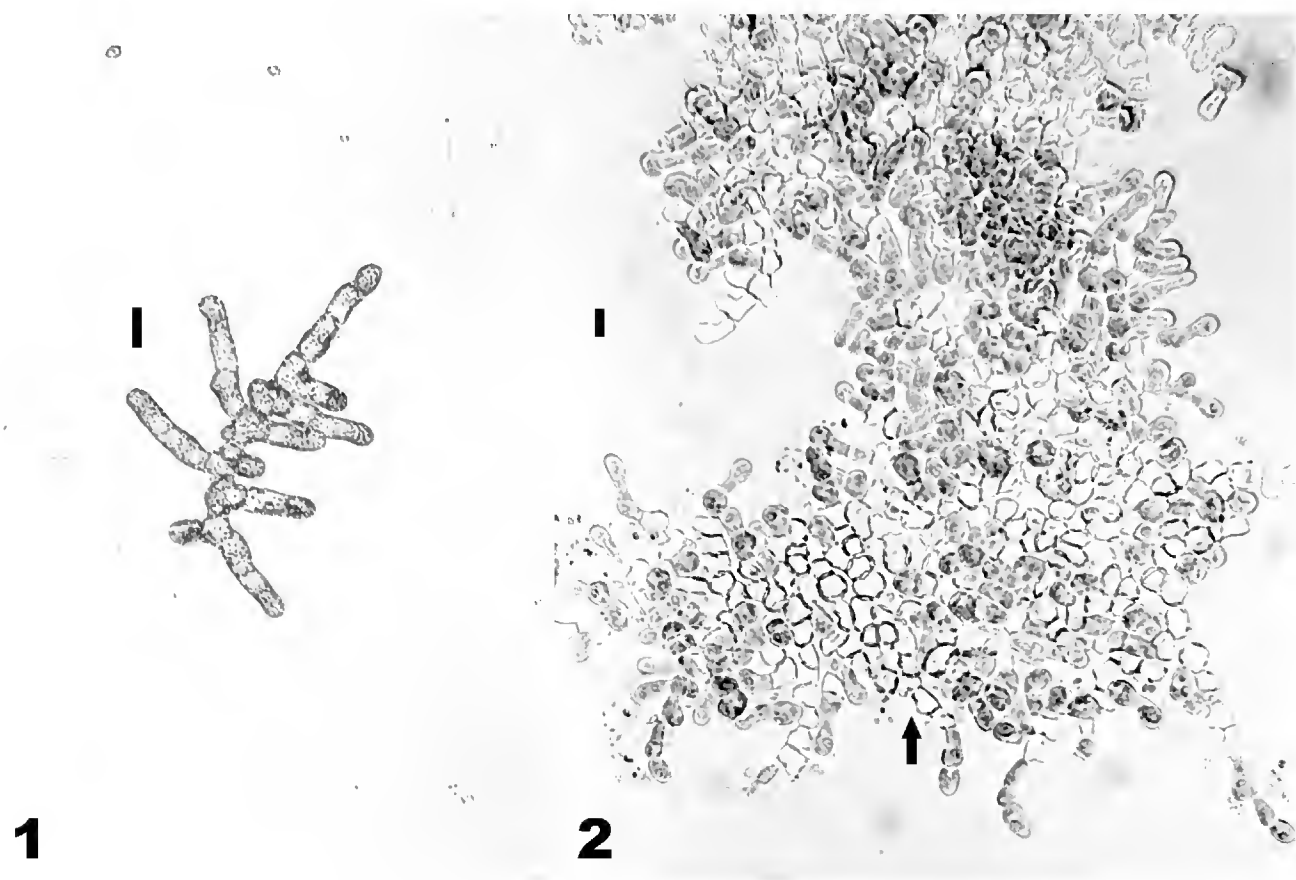
METHODS AND MATERIALS

More than 30 samples containing *Protoderma viride* were collected throughout Michigan over a 32-years period (summer months 1971–2002). The environments from which the collections were taken ranged from lotic to lentic and from shaded to bright light. *Protoderma viride* Kützting was found variously on rocks, pebbles, and macrophytes (e.g., *Potamogeton* spp., *Sagittaria* spp., *Typha latifolia*, and *Valisneria americana*) or other filamentous algae (e.g., *Chaetophora* spp., *Cladophora glomerata*, *Oedogonium* spp., and *Rhizoclonium*). For microscopy observations of samples from macrophytes, a portion of a stem or leaf epidermis containing *P. viride* was stripped and transferred to a Petri dish. In the Petri dish the thallus was either teased from the epidermis (using fine tipped forceps or a dissecting needle) prior to being mounted on a glass slide, or observed directly on a peeled epidermis. The alga was examined in strewn preparations by using either an A.O. Spencer light microscope (bright field) or a Zeiss Photoscope II light microscope (bright field, phase contrast, Nomarski interference contrast). Three preserved samples are deposited in the Central Michigan University herbarium (CMC).

RESULTS

Samples containing *Protoderma viride* were collected from: Bay County (the Saginaw River in Bay City); Charlevoix County (Iron Ore Creek, Lake Geneserath, and Font Lake on Beaver Island); Cheboygan County (Burt and Douglas Lakes); Isabella County (the Chippewa River in Mt. Pleasant and Lake Isabella); Kalamazoo County (Gull Lake); Luce County (Manistique Lake); and Midland County (Tittabawassee River in Freeland). Filaments of *Protoderma viride* are irregularly branched and horizontally growing, closely arranged and semi-radiate. They form a single layer of cells or a pseudoparenchymatous disk (Figures 1 and 2). Each cell possesses a parietal chloroplast and one pyrenoid. Asexual reproduction is by aplanospores or biflagellate zoospores; a palmelloid stage is formed by repeated division of central cells. The cell sizes I observed (3–6 μm broad and 7–11 μm long) all fell within the range of those previously reported by Prescott (1962), Sarma (1986), John et al. (2011), and Stancheva (2016). These researchers had cell dimensions of widths ranging from 3–8 μm and lengths of 6–18 μm . Biflagellate zoospores were observed being released from both field collected material or short-term cultures.

Protoderma is readily overlooked (as are many other minute encrusting algae) since it is difficult to remove it intact when sampling. It is difficult to distinguish *Protoderma* from related genera, especially those having a dominant prostrate thallus and few if any erect branches. I observed it from a number of substrata: aquatic plants, wood, stones, and other filamentous green algae (including epilithic, epiphytic, and periphytic habitats).



FIGURES 1 and 2. *Protoderma viride*. Fig 1. Young developing thallus. Scale bar = 10 μm . Fig. 2. Mature pseudoparenchymatous thallus with empty sporangia (arrow). Scale bar = 20 μm .

Protoderma viride can easily be mistaken for a number of other branched or pseudoparenchymatous green algae including *Chaetophora*, *Cladophora*, *Pseudendoclonium*, *Pseudouvella*, *Stigeoclonium* (especially young developing thalli) and even unbranched green algae such as *Oedogonium* or *Rhizoclonium*. Its cells are usually somewhat smaller than those of the genera listed above with which it may be confused. Frequently, identification of *Protoderma* is possible only if the zoospores are observed and seen to be biflagellate as they were in the majority of specimens I studied.

It is hoped this brief note will alert other Michigan phycologists, limnologists, and individuals conducting environmental studies to examine their samples a little more closely.

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NOTEWORTHY COLLECTION

***IMPATIENS PARVIFLORA* DC. (BALSAMINACEAE):
FIRST RECORD FROM WISCONSIN AND THE GREAT LAKES
REGION OF A POTENTIALLY INVASIVE SPECIES**

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Previous Knowledge. *Impatiens parviflora* (small balsam, small-flowered touch-me-not) is an annual herb native to central Asia. It became established in Europe in the mid-19th century, and today is a common and widespread invasive plant throughout eastern, central, and northern Europe (Chmura & Sierka 2006, Hejda 2012). Reczyńska et al. (2015) called it “the most commonly observed alien plant in Central European deciduous forests.”

The PLANTS Database (USDA-NRCS 2016) does not list *Impatiens parviflora* for any U.S. state, but includes it for the Canadian provinces of British Columbia, New Brunswick, Nova Scotia, Prince Edward Island, and Quebec. In 2013 thousands of plants were discovered in the understory of a mesic forest in Oregon (D. Maze s.n., July 8, 2013, OSC#241051; P.F. Zika 26231 & D. Maze, July 19, 2013, OSC#241857). As of this writing, North American observations of *Impatiens parviflora* have been posted on the citizen science website iNaturalist (2016) from Prince Edward Island, the Vancouver area of British Columbia, the Seattle area of Washington, and the Portland area of Oregon, as well as my observation from Eau Claire, Wisconsin.

Discussion. *Impatiens parviflora* was introduced to botanic gardens in Europe beginning about 1830 (Coombe 1956). Coombe speculated that the spread of the species across Europe was probably due to a single introduction of seed, because the European populations are very uniform in contrast to the polymorphism exhibited by populations in the species' native mountains of Asia. Whether or not this is true, the species has proven itself to be an extremely successful invader and has proved highly adaptable in Europe over time. Today it is common in moist deciduous forests, particularly those with some degree of disturbance and along forest edges (Chmura & Sierka 2006). It is best at colonizing areas with a sparse herb layer, but is much less successful in areas with a thick herbaceous cover (Chmura & Sierka 2006). Unlike many exotics, it has also successfully invaded undisturbed forest (EPPO 2016). *Impatiens parviflora* shows high ecological plasticity in its ability to inhabit soils of varying acidity, fertility, and moisture (Reczyńska et al. 2015), although it is intolerant of waterlogged soils (Coombe 1956). Although it was previously absent from central European oak forests, it began establishing itself in those habitats in the 1960s and now is



FIGURE 1. Dense cover of *Impatiens parviflora* on the campus of the University of Wisconsin-Eau Claire in Eau Claire, Wisconsin. Photo by Joseph R. Rohrer.

found in over 20% of vegetation sampling plots (Reczyńska et al. 2015). Mean cover of *I. parviflora* in those plots, however, has not increased in the past 30 years. The authors concluded that the presence of *I. parviflora* has not had a serious effect on oak forests and that, despite its invasion of a new community type, this weed has a low competitive ability and rarely becomes dominant (Reczyńska et al. 2015). Plant removal experiments have shown that the impact of *I. parviflora* on diversity and composition of the herb layer of forest communities was minimal (Hejda 2012).

The Eau Claire site is a highly disturbed remnant of floodplain forest on the University of Wisconsin-Eau Claire campus between Haas Fine Arts building and the Chippewa River to the south. Canopy species are a mix of native and ornamental species, some planted and others naturalized: *Acer negundo* L., *A. platanoides* L., *A. saccharinum* L., *Celtis occidentalis* L., *Fraxinus pennsylvanica* Marshall, *Gymnocladus dioica* (L.) Koch, *Morus alba* L., *Juglans nigra* L., *Populus deltoides* Marshall, *Robinia pseudoacacia* L., and *Ulmus rubra* Muhl. The shrub layer consists of saplings of a majority of the canopy species, the native shrub *Sambucus racemosa* L., and two invasive exotics, *Lonicera ×bella* Zabel and *Rhamnus cathartica* L. *Ageratina altissima* (L.) R. M. King & H. Rob. is the most common herb species found with *Impatiens parviflora*. Other common co-occurring herbs include *Erigeron annuus* (L.) Pers., *Geum canadense*



FIGURE 2. Flowers of *Impatiens parviflora*. Photo by Joseph R. Rohrer.

Jacq., *Hesperis matronalis* L., *Leonurus cardiaca* L., *Nepeta cataria* L., *Parthenocissus inserta* (A. Kern.) Fritsch, and *Urtica dioica* L. In July 2016 thousands of individuals of *Impatiens parviflora* were growing in deep shade on the slope just south of the Fine Arts building (Figure 1) and continuing westward for about 240 meters in moderate shade along the edge of a narrow forest remnant and mowed lawn to the north.

What is the potential for *Impatiens parviflora* to become a pernicious weed in the Great Lakes region, or elsewhere in the United States? Recently the USDA Plant Epidemiology and Risk Analysis Laboratory of the Animal and Health Inspection Service (APHIS 2013) published a weed risk assessment for *Impatiens parviflora* concluding that it posed a high risk. Comparing it to the other species using the weed risk assessment model of Koop et al. (2012), *I. parviflora* shared many of the traits of other invasive species (APHIS 2013). However, when compared to species with similar establishment/spread risk scores, the impact score for *I. parviflora* was relatively low. If it follows the pattern of invasion seen in Europe, it may become widespread but have only minimal impact on forest herb diversity.

Diagnostic Characters. As its name suggests, *Impatiens parviflora* can be distinguished from other exotic *Impatiens* and our two native species, *I. capensis* Meerb. and *I. pallida* Nutt., by its small flowers that measure only 0.8–1.5 cm in length. The flowers of *I. parviflora* are pale yellow with some reddish brown spotting at the throat. In contrast the exotics are various shades of red, purple, blue, or white, and *I. capensis* is orange. Only *I. pallida* has a color similar enough to be confused with *I. parviflora*, but the flowers are decidedly larger, at least 2.5 cm in length. In *I. pallida* the spur is bent at a right angle to the axis of the saccate sepal, whereas in *I. parviflora* the spur is straight (Figure 2). Leaf blades of *I. parviflora* have sharp teeth, averaging about 3 teeth per cm along the

margin; *I. pallida* has blunt teeth that are more remotely spaced with only 1-2 per cm.

Specimen Citation. Wisconsin, Eau Claire Co., City of Eau Claire, campus of the University of Wisconsin-Eau Claire, between Haas Fine Arts Bldg. on Water St. and the Chippewa River (N44.800631, W91.502274; elev. 238 meters). Carpeting shaded forest floor in highly disturbed remnant of floodplain forest. July 2, 2016, *Joseph R. Rohrer 10892* (UWEC; WIS, MICH, WTU); August 8, 2016, *Joseph R. Rohrer 10893* (UWEC).

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NOTEWORTHY COLLECTIONS

TWO NORTHWARD RANGE EXTENSIONS IN LEELANAU COUNTY, MICHIGAN

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Collinsonia canadensis L.

Lamiaceae

Richweed

Significance of Report. Significant range extension northward.

Previous Knowledge. *Collinsonia canadensis* is widespread in the eastern United States and Canada, ranging from Florida to Ontario and westward to Missouri, southern Michigan, Illinois, and southeastern Louisiana, though it is absent from much of the southeastern coastal plain. It is presumed extirpated in Wisconsin (SX), possibly extirpated in New Hampshire (SH), and rare in Vermont and Louisiana (S2) (Kartesz 1994, NatureServe 2015). The global conservation status is ranked as secure (G5) though roughly half of the range, including Michigan, has not been reviewed and ranked (NatureServe 2015). It is found in mesic deciduous forests and occasionally in deciduous swamps (Voss and Reznick 2012). Several medicinal uses of this herb have been documented (Hamel et al 1975; Herrick 1977).

Discussion. One small colony of *Collinsonia canadensis* was documented during the summer of 2010 along the border of a rich conifer swamp and old field in the Cedar River Preserve in Leelanau County, Michigan, which is owned by the Leelanau Conservancy. Though this species has been collected throughout Southern Lower Michigan, this is the first collection north of Saginaw and Kent Counties, thereby significantly extending the range northward. This is the northernmost record, not only for Michigan, but also possibly for the United States (Kartesz 2015). Collectors should be aware that this species may be found in intermediary counties and in northwestern Lower Michigan.

Diagnostic Characteristics. *Collinsonia canadensis* is the only species of *Collinsonia* in Michigan. It can be distinguished from other species in Lamiaceae by its combination of tall stature, broadly ovate leaves, and loosely-flowered terminal racemes of pale yellow, bilaterally symmetrical, flowers that have a fringed lower lip. The pedicels extend beyond the minute subtending bract. The two fertile stamens are long-exserted, and the style is gynobasic. The plant spreads by stout rhizomes. The leaves have a lemon-like fragrance (Voss and Reznick 2012).

Specimen Citation. Michigan. Leelanau Co: NW $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 9, T28N R12W. Cedar River Preserve, 1.5 mi east of Cedar, 0.5 mi south of S. Lake Lee-

lanau Rd. One small colony of approx. 20 individuals along upland edge of the rich coniferous swamp at the border of old farm field on mesic soils in partial shade. 44°50'47.90"N, 85°46'06.30"W ± 6 m. WGS 84. 186 m elevation. Associates: *Thuja occidentalis*, *Pteridium aquilinum*, *Bromus inermis*. July 15, 2010. May 005 (MICH).

Vaccinium corymbosum L.

Ericaceae

Highbush blueberry

Significance of Report. Significant range extension northward.

Previous Knowledge. *Vaccinium corymbosum* is a native blueberry of wet sandy or peaty areas, wetland forests, shrublands, bogs, fens, and rarely oak forests in the eastern United States and Canada (Voss and Reznicek 2012; Kartesz 1994). In the U.S., native populations are concentrated in southern Michigan, New England, the mid-Atlantic states, and the Atlantic and Gulf coastal plain from southeastern Virginia to eastern Texas (Kartesz 2015). This species is secure globally (G5), but declining in several regions, including New Brunswick, Illinois, and Oklahoma, where it is critically imperiled (S1), and Quebec, where it is vulnerable (S3) (Kartesz 1994, NatureServe 2015). The blueberries of commerce are derived from cultivars of this species in North America, which are often planted beyond its native range.

Discussion. During the growing season of 2016, three individual shrubs of *Vaccinium corymbosum* were found in a hardwood–conifer swamp at Soper Natural Area in the northern quarter of Leelanau County, Michigan, which is owned by the Leelanau Conservancy. This extends the range of *V. corymbosum* northward from Mason County. Commercial plantations of this blueberry are common in Leelanau and Benzie counties, including on several remnant farms that are now within Sleeping Bear Dunes National Lakeshore; these populations were not been included in the Lakeshore's flora (Hazlett 1991). The population at Soper Natural Area does not appear to have spread from cultivation. The plants are isolated within a large wetland of native flora, and, though the parcel was historically a farmstead, it was used for grazing cattle and there is no record of blueberry cultivation. Collectors should be aware that this species may occur across northern Lower Michigan and should be looked for in similar wetland habitats.

Diagnostic Characteristics. *Vaccinium corymbosum* is easily distinguished from other species of *Vaccinium* in Michigan, since it is the only species greater than one meter in height. The corollas are large, 6.5–8.5 mm long, and the leaves are mostly 4–5.5 cm long (Voss and Reznicek 2012).

Specimen Citation. Michigan, Leelanau Co: S½ of NE¼ Sec 4, T31N R11W, Leelanau Township. Soper Natural Area, one mile southwest of the village of Northport on Johnson Rd. Fifty meters N of Johnson Rd, 0.4 mi W of the M-22 intersection in hardwood-conifer swamp. 45.1207753°N, -85.6306608°W, WGS 84, ± 10 m., 204 m elevation. Associated plants: *Larix laricina*, *Thuja occidentalis*, *Linnaea borealis*, *Cypripedium reginae*, *Gaultheria procumbens*, and *Pyrola asarifolia*. July 14, 2016. May 148 (MICH).

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NOTEWORTHY COLLECTIONS

EIGHTEEN ALIEN TAXA FROM NORTHEASTERN MINNESOTA: FIRST COLLECTIONS FOR THE STATE, REGION, OR CONTINENT

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Allium cepa L. × *Allium fistulosum* L.

Liliaceae (or Alliaceae)

Walking onion

Significance of the Report. First report of this cultigen from outside of cultivation in the Great Lakes region.

Previous Knowledge. Walking onion, also known as Egyptian onion, top onion, or tree onion, is an herbaceous perennial derived by horticultural crossing of the parent species, onion and bunching onion (Maass 1997; Kim et al. 2003), respectively, which are themselves known only in, or escaped from, cultivation (Stearn 1980). The name *Allium* × *proliferum* has been used frequently, but its acceptance is unresolved (The Plant List 2013). The plants produce small bulbs in the inflorescence, and these winter-hardy bulbs may be planted in autumn (Jones and Mann 1963) or spring to grow into scallions. The bulbs may also be pickled. The plants usually do not develop seeds or large basal bulbs. If not harvested, the growing mass of bulbs tends to bend the stem to a reclined position, whereupon some of the bulbs may root and establish, enabling the clone to “walk” across the ground. *Allium cepa* × *A. fistulosum* was introduced into North America from Eurasia for culinary use. Although this hybrid was reported from outside of cultivation in Missouri and some New England states by Kartesz (2015), it was not included in the *Flora of North America* treatment by McNeal and Jacobsen (2002).

Discussion. *Allium cepa* × *A. fistulosum* was found growing in sand between a residential yard and the Lake Superior beach in Duluth, Minnesota, on public land where garden residues had been dumped. The plants were in full sun amidst a dense stand of *Ammophila breviligulata*, American beachgrass, in a well-drained topographic depression. There were two live stems, one leaning and one reclining, at the time of collection. These bore multiple bulbs, and a few other live bulbs were detached on the ground. No leaves were seen. The impression is that the taxon is persisting here but not spreading to a meaningful degree. How

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long it has persisted is not known; the dump appears to have been there for several years, as judged by its very weathered pile of branches. Four live stems of *Allium cepa* × *A. fistulosum* were found there in August 2016.

Diagnostic Characters. The hollow stems were up to 1.1 m long and 3.5 cm in diameter. They bore bulbs at the top that were up to 2.5 cm in diameter. This combination of character states will exclude other members of the genus.

Specimen Citation. Minnesota. St. Louis Co.: Duluth, Minnesota Point, NW¼ of NW¼ Sec.12, T49N R14W, August 24, 2014, *Schimpf 795* (DUL, MIN).

Allium sativum L.

Liliaceae (or Alliaceae)

Garlic

Significance of the Report. First report of this cultigen from outside of cultivation in Minnesota.

Previous Knowledge. *Allium sativum* is an herbaceous perennial derived through perhaps millenia of horticultural selection from an undetermined Asian wild progenitor (Cavagnaro and Galmarini 2007). It is propagated asexually for culinary or medicinal use of the compound bulbs and sometimes the peduncles (“scapes”). The inflorescence produces asexual bulbils (topsets), with few or no flowers or seeds (McNeal and Jacobsen 2002). The bulbils enable local spread, as could separation of the bulbels (cloves) from the compound basal bulb. The species is documented as growing outside of cultivation rather sparingly in the western Great Lakes region (Kartesz 2015). Several states farther south designate it as a noxious weed (Kartesz 2015), presumably because ingestion by dairy animals makes their milk unfit for human consumption.

Discussion. *Allium sativum* was found growing on the street-side edge of a 0.3 ha deciduous forest remnant in a residential neighborhood of Duluth, Minnesota. It was growing with *Rubus idaeus*, *Parthenocissus vitacea*, *Elymus repens*, and *Solanum dulcamara* in heavy shade of large trees (*Acer saccharum*) for the first half of the day, but exposed to the sun in the afternoon. The five stems of *A. sativum* were rooted very closely together as if a compound bulb had been discarded there and taken root. No other garden discards were seen with it. The shoots reached 8 dm height. The soil is loamy and well-drained.

Diagnostic Characters. *Allium sativum* may be distinguished from other *Allium* taxa by the combination of its paucity of flowers, cauline leaves that are flat and solid, non-fibrous bulb coat, and solitary bract wrapping the immature inflorescence (McNeal and Jacobsen 2002). Populations like the one reported here that normally develop a single layer of cloves in the bulb and a peduncle with topsets, known as hardstem garlics (Volk and Stern 2009), have sometimes been classified as *A. sativum* var. or subsp. *ophioscorodon* (Cavagnaro and Galmarini 2007). The Plant List (2013) treats those infraspecific names as synonyms of the preferred *A. sativum*.

Specimen Citation. Minnesota. St. Louis Co.: Duluth, NE¼ Sec.15, T50N R14W, July 23, 2016, *Schimpf 862* (DUL, MIN).

Bromus hordeaceus L. subsp. *hordeaceus*

Poaceae

Soft chess

Significance of the Report. First report of this non-native weed from Minnesota.

Previous Knowledge. The annual/biennial grass *Bromus hordeaceus* is native to southern Europe and North Africa (Pavlick and Anderton 2007). In North America, it lives as a weed on sites that are disturbed somewhat frequently, and has been found in all but nine states and provinces (Kartesz 2015). Subspecies *hordeaceus* seems to be the most widespread of four subspecies in North America (Pavlick and Anderton 2007). The synonym *Bromus mollis* was used widely. County records from adjacent states are few (Kartesz 2015) and minimally different from collections made decades ago (e.g., Wisconsin State Herbarium 2016; Stevens 1950; Pohl 1966; Van Bruggen 1985), giving little reason to expect that this grass is likely to become invasive in Minnesota.

Discussion. *Bromus hordeaceus* subsp. *hordeaceus* was found growing amidst rows of tall ornamental grasses on the campus of the University of Minnesota, Duluth. The individual plants were sparsely distributed across a few square meters with ample sun exposure, where the soil surface was covered with horticultural bark mulch. Landscape maintenance activity apparently eliminated all of them by summer 2016.

Diagnostic Characters. Among the annual brome grasses, *B. hordeaceus* has lemmas 1.5–2.5 mm wide in side view, with panicle branches that are shorter than their spikelets and that stand erect or are ascending. The result is a tightly arranged panicle. Subspecies *hordeaceus* may be distinguished by its longer lemmas and by straight awns that are thicker at the base (Pavlick and Anderton 2007).

Specimen Citation. Minnesota. St. Louis Co.: Duluth, NW¼ Sec.14, T50N R14W, July 31, 2013, *Schimpf* 722 (DUL, MIN).

Buxus sempervirens L.

Buxaceae

Common boxwood

Significance of the Report. First report of this non-native shrub from possibly outside of cultivation in the upper Midwest.

Previous Knowledge. *Buxus sempervirens* is a monoecious broadleaf evergreen native to southern Europe, southwest Asia, and northwest Africa (Rehder 1960). It is planted as an ornamental for its foliage and is used in floral arrangements or in evergreen wreaths. Numerous horticultural forms have been selected, some of which can grow into small trees (Rehder 1960). Many U. S. cultivars of *Buxus* now have complex hybrid ancestry (Morton Arboretum 2016). Although the flowers are not conspicuous to humans, they are insect-pollinated, and both the staminate and pistillate ones produce nectar (Von Balthazar and Endress 2002). The toxic foliage (references in Burrows and Tyrl 2001) is disfa-

vored by deer (U.S. National Arboretum 2016), which may contribute to an increase in the frequency of planting. The species has been occasionally reported from outside of cultivation in the eastern United States, largely from southern New England to Alabama (Kartesz 2015). None of those reports would appear to be an old one, given the absence of *Buxus* in Small (1933), Fernald (1950), and Gleason and Cronquist (1991). Because it is slow-growing, quite visible when neighboring deciduous species are leafless, and not spread by birds, *B. sempervirens* seems unlikely to become a troublesome invasive species.

Discussion. Two vigorous shoots of *B. sempervirens*, each about 1 m tall with basal stem diameters of 3 cm, were found on the margin of a cemetery in Duluth, Minnesota. There were no other ornamental shrubs or herbs close by. The stems were rooted a few cm apart in loamy ground immediately next to the north side of the bole of a *Pinus resinosa* tree that was about 18 m tall and 41 cm diameter at breast height. The position close to the *P. resinosa* tree may have protected the *B. sempervirens* from mowing. There was considerable summer shade from a woodlot immediately to the south. A third shoot, 2.5 cm diameter at the base and similarly close to the other two, was dead except for a few healthy-looking branches near the ground. The three shoots may be part of the same genet, because the species is known to produce suckers (Poyarkova 1949). By August, the two vigorous shoots produced seeds with fully developed embryo and endosperm. Whether the *B. sempervirens* was deliberately planted there is uncertain. These plants may have established from seed that was dispersed from a grave decoration. If they were planted there in the era of the burials, they have survived for a long time: the dates of death on the nearby grave markers are from 1900 through 1912.

Diagnostic Characters. *Buxus* has thick, opposite, entire leaves; *B. sempervirens* has blades 1.5–3 cm long and about half as wide (Boufford in press). The only other species of *Buxus* commonly cultivated in the region is *B. microphylla* (Bailey 1949; Rehder 1960). The latter differs in having young stems that are more glabrous and more prominently winged and leaves that are broadest above the middle (Bailey 1949).

Specimen Citations. Minnesota. St. Louis Co.: Duluth, SW¼ Sec.1, T50N R14W, fruiting, June 25, 2015, *Schimpf 819* (DUL, MIN); same location, flowering, April 21, 2016, *Schimpf 849* (DUL, MIN).

Centaurea diffusa Lamarck

Asteraceae

Tumble-knapweed

Significance of the Report. First vouchered report of this non-native weed from Minnesota.

Previous Knowledge. *Centaurea diffusa* is an herbaceous annual, biennial, or short-lived perennial native to southeastern Europe (Keil and Ochsmann 2006). The single stem tends to fracture near the base at the end of the growing season, allowing the finely-branched crown to be tumbled by wind across open spaces, thereby dispersing achenes. The species is designated as a noxious weed by every state in the western conterminous U. S. and is recorded from farther east,

including from many counties in Michigan (Kartesz 2015). Although Kartesz (2015) displayed seven counties in Minnesota as part of the known distribution, all seven are based on public reports to an invasive species website, and there are no specimens from those counties at DUL or MIN.

Discussion. Approximately 100 plants of *C. diffusa* were found rooted in limestone railroad ballast of an inactive spur track in Duluth, Minnesota, which is not in one of the counties reported in Kartesz (2015). There was extensive thinly vegetated land immediately adjoining the strip of ballast, but no individuals of *C. diffusa* were seen outside of the ballast. Rosettes and flowering shoots were both common. The Minnesota Department of Agriculture began an effort to eradicate this population, which was still well-established as of August 2016. Hybridization with the more common *C. stoebe* subsp. *micranthos*, spotted knapweed, to produce the fertile hybrid *C. ×psammogena* is well-known (Keil and Ochsmann 2006), and *C. stoebe* subsp. *micranthos* was present at this site. The dark-tipped phyllaries on some plants (*Schimpf* 733) may result from introgression of genes from *C. stoebe* subsp. *micranthos*. The plants collected as *Schimpf* 733 appear not to be *C. ×psammogena*, however, because they lack elongated corollas on the marginal florets, have at most a vestigial pappus, and the phyllary spines are of normal length (Keil and Ochsmann 2006).

Diagnostic Characters. Among the species of *Centaurea* that have phyllary spines measuring 3–4 mm or less, *C. diffusa* may be recognized by its non-reflexed spines on an involucre 5 mm in diameter or less (Keil and Ochsmann 2006). Corollas of the marginal florets are not longer than the others in the same head and are usually white, although pink or purplish variants are sometimes present. The occasional occurrence of white corollas in *C. stoebe* subsp. *micranthos* (Keil and Ochsmann 2006) may account for reports of *C. diffusa* from other Minnesota counties, although the marginal florets of *C. stoebe* subsp. *micranthos* have corollas that are conspicuously lengthened. After the growing season, these two species may be distinguished at a distance by observing that the phyllaries of *C. stoebe* subsp. *micranthos* are spread, exposing the bristly receptacle, whereas the heads of *C. diffusa* are constricted toward their tip, obscuring the receptacle. We do not know what *C. ×psammogena* looks like at the same stage.

Specimen Citations. Minnesota. St. Louis Co.: Duluth, Sec.18, T49N R14W, flowering, August 18, 2013, *Schimpf* 727 (DUL, MIN); same location, mature achenes, August 27, 2013, *Schimpf* 732 (DUL, MIN); same location, phyllaries with dark tips and spines, August 27, 2013, *Schimpf* 733 (DUL, MIN).

Clematis recta L

Ranunculaceae

Erect clematis

Significance of the Report. First report of this non-native ornamental from outside of cultivation in Minnesota.

Previous Knowledge. A European native (Tutin and Akeroyd 1993), *Clematis recta* is an herbaceous perennial to 1.5 m tall. It is introduced in North America for ornamental use, and has escaped to fields and thickets in New York and

Ontario (Moreno and Essig 1997) and in New Hampshire (Kartesz 2015). The genus *Clematis* is poisonous (Hardin and Arena 1974), but documented poisonings of humans or domestic animals seem to be rare (Burrows and Tyrl 2001); historical medicinal applications are summarized by Grieve (1931).

Discussion. A few dozen stems of *C. recta* were found in tall herbaceous vegetation near a residential neighborhood in Duluth, Minnesota. This population appeared to be self-perpetuating and to be spreading slowly on this sunny, well-drained, loamy site, presumably originating from cultivation in the neighborhood. Fruit production was plentiful. As is typical in the genus (Pringle 1997), the petioles and rachises of the leaves had twined upon contact with conspecific plants or with other species, thereby helping many of the clematis plants to maintain heights of about 1.5 m. Some stems were reclining. Grey-Wilson (2000) stated that wild plants in the native range tend to be shorter and to exhibit greater self-support in comparison with cultivated examples.

Diagnostic Characters. *Clematis recta* has hollow aerial stems that die after each growing season, white perianths, fragrant flowers, and achenes with pronounced rims. It may be distinguished from the introduced and naturalized species *C. terniflora* by the latter's climbing to a few meters height with perennial stems (Moreno and Essig 1997). In August 2016, the plants looked similar to those of the two previous years, with no evidence that stems had survived a previous winter or grown taller or thicker.

Specimen Citations. Minnesota. St. Louis Co.: Duluth, NE $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 5, T49N R14W, in flower, July 19, 2014, *Schimpf* 779 (DUL, MIN); same location, mature achenes, August 30, 2014, *Schimpf* 797 (DUL, MIN).

Coriandrum sativum L.

Apiaceae

Coriander or cilantro

Significance of the Report. First report of this non-native herb from outside of cultivation in Minnesota.

Previous Knowledge. *Coriandrum sativum* is a native of the Mediterranean area of Africa and Asia (Tutin 1968). This annual is cultivated for flavorings in the forms of cilantro (leaves) and coriander (dried fruits). Reports of its occurrence outside of cultivation are widely scattered in the United States and eastern Canada (Kartesz 2015).

Discussion. A few plants of *C. sativum* were found flowering in sand several meters from the Lake Superior waterline. Residential gardens behind high solid fences a few meters away could be the source of seeds. It seems unlikely that the plants were being cultivated where we found them, because there is substantial public foot traffic in this narrow strip of beach. The plants were elevated well above the water in two areas that lacked other plant species. One occurrence consisted of two maturing plants rooted within 5 mm of each other, which we inferred to be the result of germination and survival by both mericarps of the same fruit. Tutin (1968) stated that the mericarps do not separate spontaneously. Apparently this does not prevent the species from spreading. No individuals of *C.*

sativum were seen when the sites were revisited in 2015 and 2016, so the species does not seem to be perpetuating itself there.

Diagnostic Characters. The obovate petals are white, pink, or purple, and noticeably longer (to 4 mm) on the outer edge of the inflorescence. The fruits are nearly globose and can reach diameters of 6 mm (Tutin 1968).

Specimen Citation. Minnesota. St. Louis Co.: Duluth, Minnesota Point, NE $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 34, T50N R14W, August 17, 2014, *Schimpf 791* (DUL, MIN).

Eruca vesicaria (L.) Cav. subsp. *sativa* (Mill.) Thell.

Brassicaceae

Arugula or rocket

Significance of the Report. First report of this non-native herb from outside of cultivation in Minnesota.

Previous Knowledge. *Eruca vesicaria* subsp. *sativa* is an annual thought to be native to the lands around the Mediterranean Sea, but its longstanding cultivation and subsequent spread makes its native geographic range somewhat obscure (Tutin 1993). It is cultivated for salad greens and industrial oil, as well as for cooking oil and animal feed in Asia (Warwick 2010). It has been collected sparingly from the wild in much of temperate North America, but apparently not from Minnesota or Wisconsin (Kartesz 2015).

Discussion. *Eruca vesicaria* subsp. *sativa* was collected from where it had apparently spread from a garden in rural St. Louis County, Minnesota. There were approximately 100 plants with flowers and young fruits, many in infrequently mowed turf between the garden and a woodland.

Diagnostic Characters. The combination of dark veins in the cream-colored petals, dehiscent non-corky siliques, single-veined silique valves, and seedless beak on the silique distinguishes *Eruca vesicaria* from other annual species of Brassicaceae in North America (Al-Shehbaz 2010a). Subspecies *sativa* is separated on the basis of its sepals, which do not persist into fruit maturation, and its obtuse anthers (Tutin 1993).

Specimen Citation. Minnesota. St. Louis Co.: North Star Township, SW $\frac{1}{4}$ of SE $\frac{1}{4}$ Sec. 22, T53N R13W, September 3, 2013, *Pomroy and R. Barnes 2821* (DUL, MIN).

Hesperis pycnotricha Borbás & Degen

Brassicaceae

Russian dame's rocket

Significance of the Report. First report of this non-native forb from outside of cultivation in North America north of Mexico.

Previous Knowledge. *Hesperis pycnotricha* is a biennial native to the Black Sea region (Davis et al. 1988) that has spread sparingly from cultivation in Europe (Ball 1993; Costache 2011; Pýsek et al. 2002). It resembles *H. matronalis*,

dame's rocket, which is widely escaped from cultivation in North America (Al-Shehbaz 2010b). Because Al-Shehbaz (2010b) used a broad morphological concept for *H. matronalis* when examining North American collections (Ihsan Al-Shehbaz, personal communication, 2016) it is possible that *H. pycnotricha* grows as an escape elsewhere in North America. Ball (1993) remarked that the distinctness and rank among the eleven European taxa in the genus, which include these two species, was questionable. Dvořák (1966) documented smaller seeds, pollen, and chromosome number of *H. pycnotricha* ($2n = 14$), as compared to *H. matronalis* ($2n = 24$), and asserted that *H. pycnotricha* has smaller flowers. Rollins (1993) included plants with $2n = 14$ within his broad concept of *H. matronalis*. There appears to be no standard English name for *H. pycnotricha*. The Swedish name *rysshesperis* translates as "Russian hesperis."

Discussion. A population of a few dozen flowering and fruiting individuals of *Hesperis* scattered on a loamy vacant lot in Duluth, Minnesota appears to be *H. pycnotricha*. A house had been razed and the land graded on the site a year or two before in preparation for commercial construction. The site was shade-free, well-drained, and occupied by a variety of weedy herbaceous species, perhaps a few of which had been planted for erosion control. *Hesperis matronalis*, a common escape in the city, was not seen on the site. The year after specimens were collected, much of the soil was removed to reduce the elevation, and the site was paved for parking. The population may be regarded as extirpated, although we do not know where the soil was moved. The plants may have descended from ornamentals at the residence prior to razing.

Diagnostic Characters. Plants were 7–9 dm tall in flower, with a taproot to 10 mm diameter and a stiff stem. Mid- to upper-cauline leaves were erect, clasping, and sessile. This accords with the treatment of Ball (1993), who described such leaves on *H. matronalis* as short-petiolate and non-clasping. Al-Shehbaz (2010b) described such leaves of *H. matronalis* as short-petiolate, whereas Rollins (1993) stated that they are often sessile. Pedicels of *Hesperis pycnotricha* were erect in both flower and fruit. Pedicels with immature fruit were typically held at angles of 30–45° from the rachis, whereas those of *H. matronalis* herbarium specimens were typically held at angles of 75° or more. The inflorescences of *H. pycnotricha* thereby look denser from a distance than those of *H. matronalis*. The differences between these species in the angles at which the pedicels are held persisted in maturity. The more erect habit could have been the result of the brightly lit site. Dvořák (1966) cites Tsvelev as contrasting the steppe habitat of *H. pycnotricha* in its native range with the shadier, moister habitats for its congeners in the (now former) Soviet Union. Many individuals of *H. pycnotricha* at our site had anthocyanic herbage. This does not seem to be the result of toxic or infertile soil, because the neighboring species had normal coloration. The median length of seeds measured with an ocular micrometer was 2.1 mm for 57 seeds of *H. pycnotricha* vs. 3.0 mm for 25 seeds of *H. matronalis* collected in the same year elsewhere in the city. The latter is within the range for *H. matronalis* reported by Al-Shehbaz (2010b), who gives 2.5 mm as the low extreme. Rollins (1993) reported the seed length of *H. matronalis* to be 3–4 mm. The mean weights of these seeds did not closely match the ones reported for either species by Dvořák (1966). About 80% of seeds taken from *H. pycnotricha*

germinated within a few days on wet paper after dry storage at room temperature. Seedling root tips were fixed and stained using the procedure of Snow (1963), squashed, and observed at 1000 \times . No more than 14 well-separated condensed chromosomes were seen. Squashes developed from local *H. matronalis* seed collections yielded 23 or 24 well-separated condensed chromosomes. The petals of *H. pycnotricha* seen by us were not always shorter than those of *H. matronalis*, contrary to the description by Dvořák (1966). *Hesperis matronalis* populations are often characterized by the presence of both white-petalled individuals and pink- or purple-petalled ones. Our population of *H. pycnotricha*, however, had only purple-petalled individuals, which is consistent with the description in Ball (1993).

Specimen Citations. Minnesota. St. Louis Co.: Duluth, SW $\frac{1}{4}$ Sec. 23, T50N R14W, in flower, June 29, 2013, *Schimpf 710* (DUL, MIN, MO); same location, mature fruit, July 19, 2013, *Schimpf 716* (DUL, MIN).

Lavatera thuringiaca L.

Malvaceae

Tree mallow

Significance of the Report. First report of this non-native ornamental from outside of cultivation in Minnesota.

Previous Knowledge. The tall herbaceous perennial, *Lavatera thuringiaca*, has escaped from ornamental cultivation in Wyoming and North Dakota and in central to eastern Canada (Kartesz 2015). Its native range is from central to southeastern Europe (Fernandes 1968). The genus *Lavatera* is very similar to *Malva*, both morphologically and molecularly, and the two may eventually be merged (Hill 2015). Hill (2015) and Kartesz (2015) both report *L. thuringiaca* from Minnesota only because the collection reported here had been divulged to both of those authors.

Discussion. About two dozen flowering stems of *L. thuringiaca* reaching 2 m in height were found outside of cultivation in Duluth, Minnesota. Some were under large deciduous trees, others in open tall herbaceous vegetation between the trees and a residential street. The soil is well-drained and loamy. Three growing seasons later, the plants had evidently been pulled out, as inferred from the disturbed condition of the site. The population had produced mature seeds for at least one year, so dormant seeds may have been left on the site after the plants were pulled. Staszewski and Staszewska (1994) reported hard seed coats in 10–50% of the seeds of this species, which prevents germination until the coat is scarified.

Diagnostic Characters. Fryxell and Hill (2015) distinguish *Lavatera* from *Malva* by the elliptical transverse shape of the mericarp of the former, its rounded mericarp edges, its pericarp that readily separates from the seed coat, its swollen style base that is persistent on the fruit, and its bractlets below the calyx that are connate for about half their length. *Lavatera thuringiaca* differs from congeners known to have escaped in North America by its herbaceous perennial habit (Hill 2015).

Specimen Citations. Minnesota. St. Louis Co.: Duluth, NW¼ of NW¼ Sec. 12, T50N R14W, in flower, August 11, 2013, *Schimpf 725* (DUL, MIN); same location, mature fruit, August 25, 2013, *Schimpf 731* (DUL, MIN).

Leymus arenarius (L.) Hochst.

Poaceae

European lyme grass

Significance of the Report. First report of this non-native perennial grass from outside of cultivation in Minnesota and the first report of it from the coast of Lake Superior.

Previous Knowledge. The perennial grass *Leymus arenarius* is native to coastal sands of northern Europe. It produces long horizontal rhizomes and has been introduced elsewhere for the purpose of stabilizing sands, or it may also have been unintentionally introduced within the solid ballast of ships (Bowden 1957). In the Western Hemisphere it has been reported as established or naturalized in southern Greenland and in the north-middle latitudes of North America, including along some of the Great Lakes (Barkworth 2007a) other than Lake Superior. The species is cultivated as an ornamental (Darke 1999). *Leymus arenarius* is legally regulated as invasive by the State of Wisconsin (Wisconsin DNR 2015). Older publications use the name *Elymus arenarius* for this species.

Discussion. *Leymus arenarius* was found dominating several square meters of sand between a public park building and a Lake Superior beach in Duluth, Minnesota. All shoots were non-flowering. Bond (1952) characterized the species as flowering infrequently in many parts of its native range and as routinely reproducing by dispersed rhizome fragments. The Duluth colony was almost fully surrounded by, but did not extend into the area directly under, taller native woody vegetation. We suspect that the species had been introduced by planting activity intended to stabilize the sand many years before. The colony is about 50 m from the edge of the vegetation that can be reached by storm waves.

Diagnostic Characters. The structural features usually used for identification (Barkworth 2007a) were not available because of the lack of flowering culms. The leaves were thickly glaucous on both sides with stiff blades up to 16 mm wide, the adaxial sides of which were deeply, closely, and uniformly ribbed. Although Barkworth (2007a) described *L. arenarius* as having blade widths up to 11 mm, Bond (1952) indicated that 2 cm is the upper limit. *Leymus mollis* is a similar species that might be expected to occur here. This North American native has been collected from Lake Superior shores in Ontario (Bowden 1957) and Michigan (Voss and Reznicek 2012). The auricles of *Leymus mollis* can attain 0.7 mm in length (Barkworth 2007a), whereas those of the Duluth material were 2–3 mm long. We did not find any published reports of auricle dimensions for *L. arenarius*. Bond (1952) described the auricles as conspicuous. Bowden (1957) reported that the abaxial epidermis of the blade of *L. mollis* had less conspicuous stomata than that of *L. arenarius*, but did not provide an illustration. *Leymus arenarius* is octoploid and *L. mollis* is tetraploid (Bowden 1957); thus, if the nuclear genome of *L. arenarius* is actually the larger one we would expect

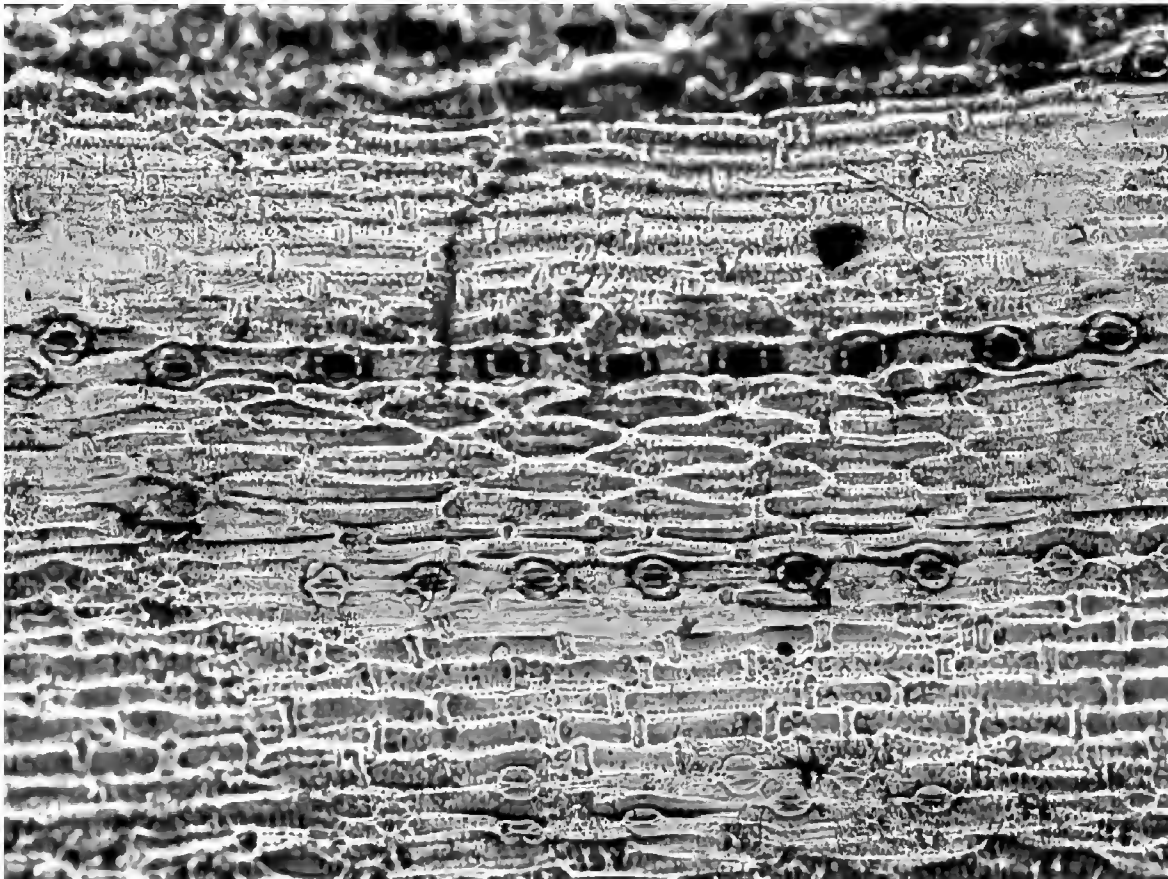


FIGURE 1. Brightfield photomicrograph of acetate film peeled from abaxial epidermis of blade of *Leymus arenarius* from Greenland (*V. Garlough s.n.*, DUL). Numerous pairs of guard cells with prominent subsidiary cells are visible. The image represents a portion of the peel 1.3 mm by 1.0 mm. Photograph by D. J. Schimpf.

the guard and subsidiary cells of *L. arenarius* stomata to be longer (Beaulieu et al. 2008) than those of *L. mollis*. We examined acetate impressions of epidermises (Hilu and Randall 1984) of the Duluth colony with transmitted light, at 40 \times , 100 \times , and 400 \times , as well as those of herbarium specimens of *L. arenarius* and *L. mollis* that could be readily identified from their fruiting culms. Before we applied the dissolved acetate, the abaxial leaf surface was rubbed with acetone-wetted cotton to remove cuticular wax. In the herbarium material, the stomatal apparatus of *L. arenarius* was much more visible than that of *L. mollis*. The stomatal apparatus of the Duluth field material resembles that of *L. arenarius* much more closely than it does that of the herbarium specimens of *L. mollis* (Figures 1–3). Figure 3 is also representative of the epidermis of the other three collections of *L. mollis* that we examined. The stomatal appearance (Bowden 1957) and gross blade morphology (Barkworth 2007a) of the introduced Eurasian *L. racemosus* are like those of *L. arenarius*. The ligules of the Duluth plants were as much as 1 mm long, which is within the range of *L. arenarius* but below the 1.5–2.5 mm range of *L. racemosus* (Barkworth 2007a).

The gross vegetative morphology of *Leymus arenarius* somewhat resembles that of *Ammophila breviligulata* (Barkworth 2007b), a native species that is abundant on Great Lakes coastal sands, and non-flowering robust glaucous variants of the latter species could resemble lyme grass from a distance. Barkworth (2007b) described *A. breviligulata* ligules as being 1–3 mm long, whereas those

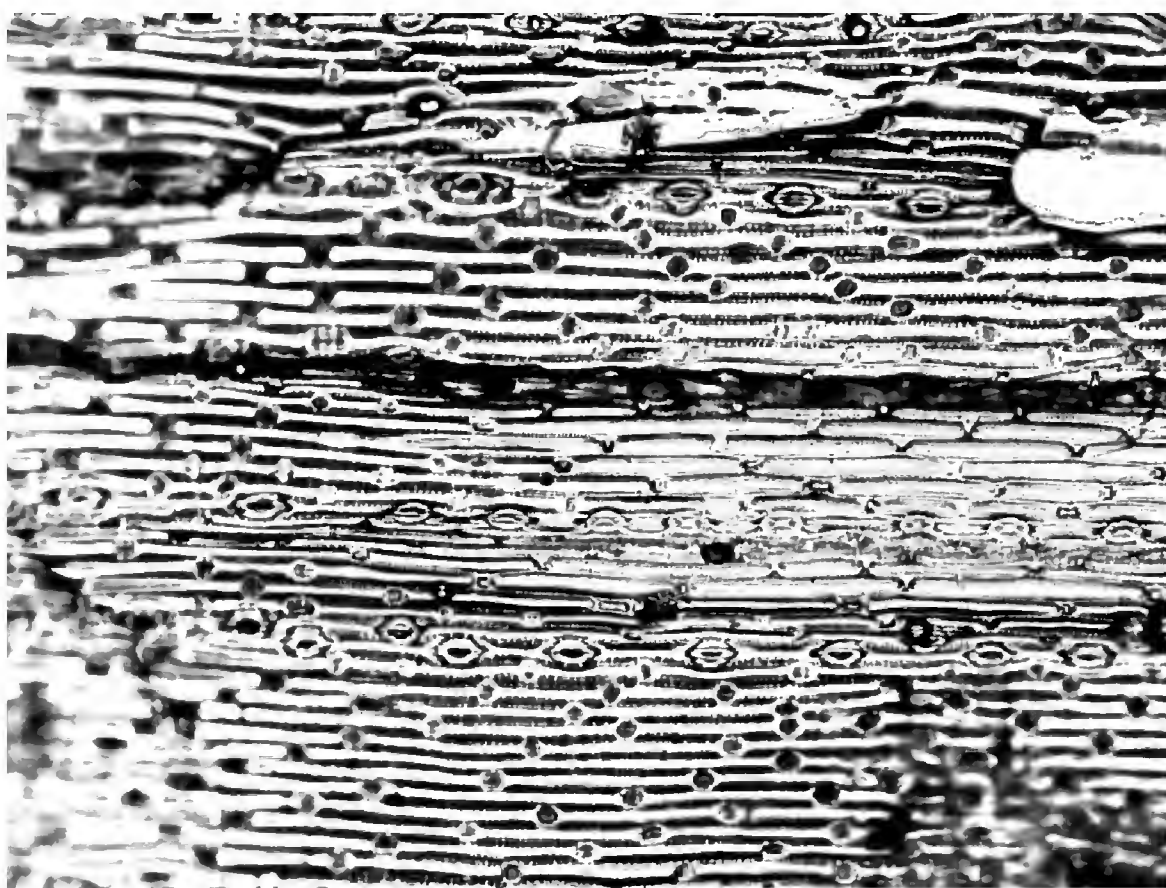


FIGURE 2. Brightfield photomicrograph of acetate film peeled from abaxial epidermis of blade of *Leymus arenarius* from Duluth, Minnesota (*D. J. Schimpf* 824, DUL, MIN). Numerous pairs of guard cells with prominent subsidiary cells are visible. The image represents a portion of the peel 1.3 mm by 1.0 mm. Photograph by D. J. Schimpf.

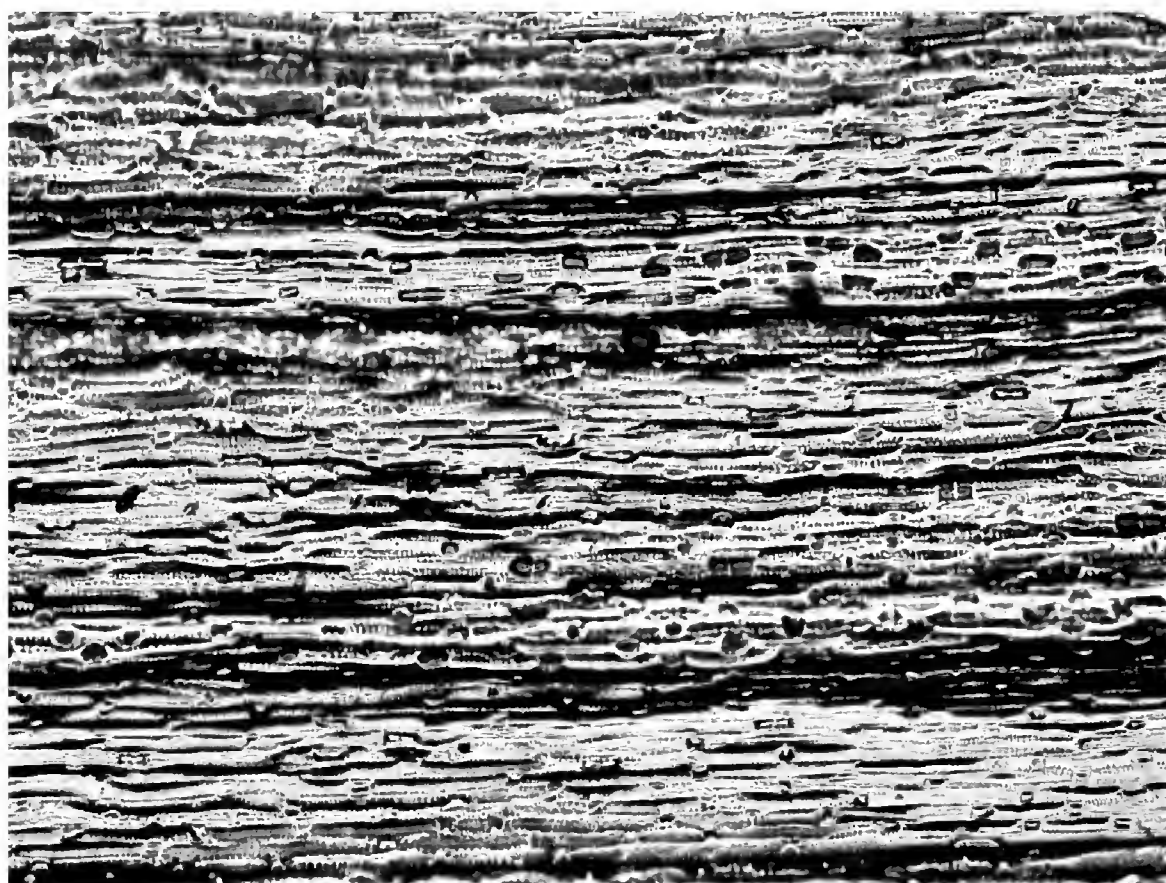


FIGURE 3. Brightfield photomicrograph of acetate film peeled from abaxial epidermis of blade of *Leymus mollis* from Kugluktuk, Nunavut (formerly Coppermine, Northwest Territories), Canada (*W. I. Findlay* 244, DUL). Guard cells and subsidiary cells are much less obvious than in Figures 1 and 2. The image represents a portion of the peel 1.3 mm by 1.0 mm. Photograph by D. J. Schimpf.

of the Duluth plants that we determined as *L. arenarius* were no more than 1 mm long. The blades of *Ammophila breviligulata* are 8 mm wide or less (Barkworth 2007b). The most important distinction, however, is that the genus *Ammophila* lacks auricles (Barkworth 2007b).

Specimen Citation. Minnesota. St. Louis Co.: Duluth, Minnesota Point, SE¼ Sec. 2, T49N R14W, August 17, 2014, *Schimpf 806* (DUL, MIN).

Malus ×robusta (Carr.) Rehder

Rosaceae

Hybrid Siberian crab apple

Significance of the Report. First report of this non-native tree from outside of cultivation in the upper Great Lakes region.

Previous Knowledge. *Malus ×robusta* is the product of hybridization between the Asian deciduous trees *Malus baccata*, Siberian crab, and *M. prunifolia*, Chinese crab (Rehder 1960). The parent species are planted in North America as ornamentals, and deliberate crosses between them are made in the nursery industry. Both of the parent species are also grown from seed as rootstocks for *M. pumila* (Dickson 2014) and may develop sprouts from below the graft that could flower. *Malus ×robusta* has been reported from outside of cultivation in one county of southeastern Ohio (Vincent et al. 2011). Kartesz (2015) indicates that this is the only North American record from the wild, whereas USDA NRCS (2016) indicates that this nothospecies also occurs in one or more unspecified counties of New York.

Discussion. A single *Malus ×robusta* tree was found growing vigorously on public primitive recreational land in Duluth, Minnesota, within several hectares of shallow loamy soil and anorthositic bedrock exposures (Miller and Green 2008) that slope gently northward toward cliff tops. The associated plant species were largely native. The approximately 1 km distance of this location from current or evident past settlements supports our inference that *M. ×robusta* was dispersed there by a wild bird or mammal. The tree consisted of three trunks, each about 15 cm in diameter and anatomically connected to each other near the base, and numerous basal sprouts. The crown reached a height of 4–5 m, and there were no taller trees nearby. The fruits had well-developed seeds, but no seedlings of *Malus* were seen nearby. The flesh of the fruit in late September was yellow, crisp, juicy, and tart-sweet, but not bitter.

Diagnostic Characters. The long-stalked fruits that lack a calyx and are about 2 cm in diameter are distinctive (Rehder 1960). According to the literature, there may be inconsistent retention of the calyx (Rehder 1960), but none of the dozens of fruits examined from this tree exhibited that character. The fruits were glossy yellowish green, often with a red cheek, at the time of collection, becoming almost wholly red by late September. Some fruits and leaves reddened in the plant press. The fruits were impressed on both ends, with fresh diameters of 21–26 mm that were about 1.15 to 1.25 times their length. The pedicels were 3–4.5 cm long. According to Cuizhi and Spongberg (2003), *M. prunifolia* var. *prunifolia* lacks sepals in fruit, the fruits are 2–2.5 cm diameter, and the pedicels at ma-

turity are 2–3.5 cm long, but the fruits of that species are not impressed at the apex (Rehder 1960). The fruits of *M. ×robusta* look like domesticated cherries dangling from the branches, and Stace (2010) referred to the species as cherry crab.

Specimen Citations. Minnesota. St. Louis Co.: Duluth, NW¼ Sec. 6, T49N R14W, fruiting, August 21, 2016, *Schimpf* 867 (DUL, MIN); same tree, with fragrant flowers, June 1, 2017, *Schimpf* 883 (DUL, MIN).

Nepeta racemosa Lam.

Lamiaceae

Racemed catnip

Significance of the Report. First report of this non-native ornamental from outside of cultivation in Minnesota.

Previous Knowledge. *Nepeta racemosa* is an herbaceous perennial with blue-violet flowers native to the Caspian-Caucasus region (Sell and Murrell 2009). It is cultivated as an ornamental, often under the name *N. mussinii* (e.g., Bailey 1949), or as a source of essential oils (Pistrick 2006). Just a few North American occurrences outside of cultivation have been reported—from Quebec, Ontario, and from one county in each of New York, Wisconsin, Colorado, and Wyoming (Kartesz 2015). *Nepeta racemosa* has generally not been included in identification manuals for plants outside of cultivation in North America.

Discussion. One plant with 10 flowering stems was observed in open herbaceous vegetation on dunal sand in Duluth, Minnesota. It was in an apparent old dump site for yard and garden debris from the nearby residential neighborhood, situated in a low (but not wet) position in a matrix of *Ammophila breviligulata* with the latter's normal shoot density. The site, which is on public land, did not give the impression that it had ever been a “satellite garden.” In August 2016, there were about twice as many flowering stems as in the previous year, all still rooted close together.

Diagnostic Characters. Among the blue-flowered *Nepeta* commonly grown in North America, *N. racemosa* may be distinguished by its cordate leaf blades less than 3 cm long (Sell and Murrell 2009) and by petioles that are less than half the blade length. The most similar cultivated species is probably the horticultural interspecific hybrid *N. ×faassenii*, which has cuneate blade bases and seldom produces fruit (Sell and Murrell 2009). Numerous mature nutlets were collected from the Duluth plants on August 1, 2015, but no more than two full-size nutlets were found to have developed from the four ovules in any one flower. The nutlets are tuberculate and dark brown with a bright white scar near their base. *Nepeta cataria*, the widely naturalized common catnip, has whitish corollas. Post-flowering plants can be distinguished by the purple calyx nerves and lobes of *N. racemosa*, leaves of *N. cataria* that have blades longer than 3 cm and petioles about half as long (Sell and Murrell 2009), and the lack of tubercles on the nutlets of *N. cataria* (Budantsev and Lobova 1997).

Specimen Citation. Minnesota. St. Louis Co.: Duluth, Minnesota Point, NW¼ of NW¼ Sec. 12, T49N R14W, July 13, 2015, *Schimpf* 824 (DUL, MIN).

Origanum vulgare L.
Lamiaceae
Wild marjoram

Significance of the Report. First report of this non-native herb from outside of cultivation in Minnesota.

Previous Knowledge. The culinary herb *Origanum vulgare* is a rhizomatous perennial native to Europe that has long been cultivated in North America. Its escape to the wild has been reported from many northeastern and western states and in eastern and western Canada, but scarcely from the more central states and provinces (Kartesz 2015). This species is often referred to as oregano, but the food ingredient that is well-known in North America by that name is sometimes derived from other taxa (Calpouzos 1954). In addition to the use of its leaves for flavoring, *O. vulgare* is valued for ornament and for use in fragrance mixtures (Kew Royal Botanic Gardens 2016).

Discussion. A population of *Origanum vulgare* was discovered on a steep weedy street-side bank in a residential neighborhood of Duluth, Minnesota. The soil was loamy and the plants were exposed to morning sun. This occurrence likely represents persistence after abandonment of cultivation, and perhaps short-distance spread. The part of the population not under woody cover was occasionally trimmed down with the rest of the rank vegetation, but not close to the ground. Its abundance in the summers of 2015 and 2016 appeared to be comparable to that in 2014. Plants were localized in dense patches that each covered about one-tenth to a few tenths of a square meter, and that collectively covered a few square meters. Flowering began in the second half of July. The population contained plants with reddish pink corollas and others with white corollas, the latter being much more common. The flowers with reddish corollas are subtended by bracts with a reddish purple overcast, whereas those with white corollas are subtended by pale green bracts. Major floras for the region (Fernald 1950; Scoggan 1979; Gleason and Cronquist 1991; Voss and Reznicek 2012) and a popular field guide (Newcomb 1977) used the reddish colors as a diagnostic character state, but the frequent pale-hued plants at Duluth fit easily within the variation described for the native range (Fernandes and Heywood 1972). Both color forms later had plentiful matured nutlets, often three or four in the same flower.

Diagnostic Characters. *Origanum vulgare* has woody shoot bases (Fernandes and Heywood 1972). The plants at the Duluth site were 7–8 dm tall in flower. The leaf blades were up to 4 cm long, ovate and nearly entire, on petioles up to 1 cm. The inflorescence has round-topped clusters of flowers with subtending bracts, usually on three long branches. The calyx is regular, with a villous throat. The corolla has a bilobed upper lip and a trilobed lower lip. The upper two stamens reach the end of the corolla tube; the lower two extend well beyond it. The most similar species, *O. heracleoticum*, which is reported as escaped in British Columbia (Kartesz 2015), has inflorescence bracts that are more densely glandular and shorter (2–3 mm vs. 4–5 mm) than those of *O. vulgare* (Fernandes and Heywood 1972).

Specimen Citations. Minnesota. St. Louis Co.: Duluth, NE $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 15, T50N R14W, white-flowered and green-bracted, August 11, 2014, *Schimpf* 787 (DUL, MIN); same location, pink-flowered and purple-bracted, August 11, 2014, *Schimpf* 788 (DUL, MIN).

Rosa canina L.

Rosaceae

Dog rose

Significance of the Report. First report of this non-native ornamental from outside of cultivation in Minnesota.

Previous Knowledge. Species of *Rosa* introduced in North America include *R. canina*, a tall deciduous non-rhizomatous shrub native to Europe, Asia, and North Africa (Lewis et al. 2014) that is commonly used as a rootstock for grafting (Rehder 1960). The widespread North American distribution outside of cultivation is mapped at Kartesz (2015). It has a pentaploid somatic karyotype, which, according to Klášterský (1968), is the result of meiotic behavior that leads to progeny routinely deriving 7 chromosomes from the pollen and 28 chromosomes from the ovule. This mechanism of sexual reproduction is extremely rare among higher plants, but is also known in other species of *Rosa* section *Caninae* (Grant 1971), the section to which *R. canina* belongs.

Discussion. *Rosa canina* was common over perhaps 20 m² in a clearing of about 500 m² in a woodland composed of both evergreen conifer and deciduous angiosperm trees in Duluth, Minnesota. The wooded area covered about 3 ha between a residential neighborhood and a commercial neighborhood. The soil of the clearing was shallow amidst scattered small bedrock exposures. The other shrubby or herbaceous species in the clearing included both native and non-native taxa. Fruiting of *R. canina* was sparse in 2014, but the fruits that were produced were filled with plump achenes. Fruits were more abundant in August 2016.

Diagnostic Characters. The arching stems reached about 2 m in height and as much as 2 cm in basal diameter. The prickles are stout and recurved and are in pairs below the adnate stipules. The petals of these plants were 2 cm long and light pink, although white or rose petals have been reported for this species (Lewis et al. 2014). The glabrous scarlet hips were 2 cm long and 1.5 cm diameter, thickened around the orifice, with the styles not exerted. The sepals were still on the fruit in the September collection. Some sepals have long lanceolate appendages, but others on the same fruit lack these. Sepals are abaxially eglandular. The leaves were glabrous and abaxially eglandular.

Specimen Citations. Minnesota. St. Louis Co.: Duluth, NE¹/₄ Sec. 14, T50N R14W, flowering, July 16, 2014, *Schimpf 775* (DUL, MIN, MO); same location, fruiting, September 12, 2014, *Schimpf 800* (DUL, MIN, MO).

Rosa spinosissima L.

Rosaceae

Scotch rose

Significance of the Report. First report of this non-native ornamental from outside of cultivation in Minnesota.

Previous Knowledge. *Rosa spinosissima* is a medium-height deciduous rhizomatous shrub native to Eurasia (Lewis et al. 2014). Many older publications use the name *R. pimpinellifolia* for this taxon. It has escaped from cultivation in many states of the Midwest and New England, as well as in eastern Canada (Kartesz 2015).

Discussion. A patch of *R. spinosissima* in Duluth, Minnesota apparently represents an escape from cultivation and has expanded in tall herbaceous vegetation. This is on an open south-facing loamy slope below a residential neighborhood and above a school building. The colony appeared to be spreading slowly down the hill by means of rhizomatous extension in a compact “phalanx” (Lovett Doust 1981) pattern. This patch dominated at least 30 m² at the time of collection. The fruits contained large achenes, but we do not know whether local reproduction had occurred through seed germination.

Diagnostic Characters. The plants were about 1 m tall and grew in dense patches. The prickles are mostly straight and not especially stout. The leaflets are 7–9 per leaf and no more than 1.5 cm long, which gives the plant a finer-textured appearance than that of most other species of *Rosa*. The flowers are solitary, with a glabrous, subglobose hypanthium. The petals in this colony were pure white, although yellow and pink phenotypes are also known in cultivation (Bailey 1949). The fruits were very abundant, with globose hips that matured black-purple and reached 15 mm in diameter. The sepals, which lack appendages, remained on the ripe fruits.

Specimen Citations. Minnesota. St. Louis Co.: Duluth, NE¹/₄ of NW ¹/₄ Sec. 5, T49N R14W, flowering, June 28, 2014, *Schimpf* 766 (DUL, MIN, MO); same location, fruiting, August 30, 2014, *Schimpf* 798 (DUL, MIN, MO).

Salvia ×*sylvestris* L.

Lamiaceae

Hybrid clary

Significance of the Report. First report of this non-native ornamental from outside of cultivation in Minnesota.

Previous Knowledge. *Salvia* ×*sylvestris*, an herbaceous perennial, is a partially fertile (Stace 2010) horticultural cross of the European natives, *S. nemorosa* and *S. pratensis*. It is cultivated for ornamental use, and blue is the commonest corolla color. It is known outside of cultivation in North America, including in states and provinces that adjoin Minnesota (USDA NRCS 2016). The name *S. sylvestris* has been used to refer to *S. nemorosa* (e.g., Fernald 1950).

Discussion. Dozens of individuals of *S.* ×*sylvestris* were found in a public park in a commercial district of Duluth, Minnesota, evidently derived from seed dispersed from plants in a nearby ornamental bed that had been neglected. Many plants were rooted in cracks or joints in the cap of an old stone retaining wall downslope from the weedy bed, and many others were established in well-drained turf near the bed. Some of these escaped progeny were maturing seed in light shade or full sun, whereas many others were non-flowering. Three years later, *S.* ×*sylvestris* was still well-established and flowering in both settings. In 2016, *S.* ×*sylvestris* was also found in turf near a different ornamental bed where this species was being grown, about 75 m away from the first one. The bed near this later find was currently maintained, and the turf appeared to be mowed more frequently. Again, both flowering and non-flowering shoots were in this turf, al-

beit fewer than in the first area. The stems in the turf had been cut by mowing. The species was absent from the area between the two collection sites.

Diagnostic Characters. Like *S. nemorosa*, *S. ×sylvestris* has corollas less than 15 mm long and purple floral bracts; like *S. pratensis*, *S. ×sylvestris* has just a few pairs of cauline leaves, which become much smaller at successively higher nodes (Bailey and Bailey 1976). Some of the Duluth plants had green floral bracts, and the others had a mixture of green and purple floral bracts on the same individual.

Specimen Citations. Minnesota. St. Louis Co.: Duluth, SW $\frac{1}{4}$ Sec. 23, T50N R14W, in stone crevices, July 14, 2013, *Schimpf 714* (DUL, MIN); same quarter-section, in turf, July 20, 2013, *Schimpf 719* (DUL, MIN); same quarter-section, in turf near statue, September 3, 2016, *Schimpf 873* (DUL, MIN).

Spiraea japonica L.f.

Rosaceae

Japanese spiraea

Significance of the Report. First vouchered report of this non-native shrub from outside of cultivation in Minnesota.

Previous Knowledge. *Spiraea japonica* is a deciduous shrub native to China, Japan, and Korea (Lis 2014). It is planted in North America as an ornamental and has escaped to the wild in many eastern states as well as in Ontario and Nova Scotia (Kartesz 2015). Ramsey County, Minnesota is mapped by Kartesz (2015), one of very few county-specific locations for this species in the western Great Lakes states, but there are no voucher specimens of *S. japonica* at DUL or MIN from any Minnesota counties. *Spiraea japonica* exhibits relatively great variation in its native range (Ōi 1965; Zhao-Yang et al. 2002) as well as in many cultivated selections. *Spiraea ×bumalda* has recently been considered by some (e.g., Wilson and Hoch 2009; Lis 2014) to be merely a variant of *S. japonica*, but see The Plant List (2013) for a contrasting view. *Spiraea ×bumalda* has been reported from outside of cultivation much less frequently, and a Ramsey County occurrence for it (Kartesz 2015) likewise seems to lack a voucher specimen. The Ramsey County designations for both taxa stem from public reports to an invasive species website (Kartesz 2015). *Spiraea japonica* has been tagged as a problematical invader in part of the eastern United States (Lis 2014; Wilson and Hoch 2009).

Discussion. Two individuals of *S. japonica* were found near a long primitive path leading to a public overlook structure on a prominence south and east of the residential area of Silver Bay, Minnesota. This is well-separated from locations with planted ornamentals. The plants were in shade provided by *Populus tremuloides*, *Betula papyrifera*, and *Abies balsamea* where *Diervilla lonicera* is also a common low shrub. The soil was shallow, loamy, and well-drained and lay over ophitic olivine diabase bedrock with anorthosite outcrops scattered nearby (Miller 1988). One individual of *S. japonica* grew right next to the path, and the other one about 8 m away from the path, approximately 100 m from the structure and 300 m from where the other end of the path meets a road. The two

plants were about 5 dm tall and had rose-colored petals and green leaves; cultivars with golden or bronze leaves are known to tolerate less shade (Snyder et al. 2000). The dryness of the site may account for the shortness of the stems, in that *S. japonica* is characteristically an invader in moister settings and may reach 1.5 m in height (Lis 2014).

Diagnostic Characters. *Spiraea japonica* has a compound corymbose inflorescence that is usually terminal and broader than high, stamens that are much longer than the petals, and divergent follicles. Leaf traits are often used in keys, but they exhibit considerable variation. The leaves of the Silver Bay plants most closely resembled the illustration of *S. japonica* var. *japonica* in Zhao-Yang et al. (2002). For identification of *Spiraea* consult Bailey (1949), Rehder (1960), or Lis (2014).

Specimen Citation. Minnesota. Lake Co.: Silver Bay, SE $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 31, T56N R7W, 9 July 2016, Pomroy, S. Deodhar, and R. Barnes 2859 (DUL, MIN).

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NOTEWORTHY COLLECTIONS

A NEW SLIME MOLD FOR OHIO

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Physarum gyrosum Rostafinsky
Physaraceae

Significance of the Report. This is the first report of the species for the state of Ohio.

Previous knowledge. *Physarum gyrosum* is a widespread slime mold that is known from Europe, Asia, Africa, South America, Pacific islands (Hawaii, New Zealand), Australia, and North America (GBIF 2016; Ing 1999; Liu et al. 2013; Yamamoto 1998). In the continental United States, the species is known from at least California, Colorado, Florida, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Nebraska, New Hampshire, New York, North Carolina, North Dakota, Pennsylvania, Virginia, and Wyoming (GBIF 2016; Hagelstein 1944; MYCOPORTAL 2016). The species is not listed in any work on slime molds for Ohio (Fullmer 1921; Keller and Braun 1999).

Discussion. The placement of this species has varied from treatment to treatment of slime molds. *Physarum gyrosum* was first described by Rostafinsky in 1874 (Rostafinsky 1874–1876) from specimens from Europe. Lister (1894) first placed the species in synonymy under *Fuligo septica* Gmelin, but later (Lister and Lister 1902) confirmed the distinct nature of the species. Among treatments for slime molds in North America, Macbride (1922) placed *P. gyrosum* in synonymy under *P. bethelii* (Macbride) Lister in one place, while recognizing it as distinct elsewhere in the same publication. Hagelstein (1944) and Martin and Alexopoulos (1969) recognized the species as distinct. It has also been treated as a species of *Fuligo*, *F. gyrosa* (Rostaf.) E. Jahn (Lado 2001). Most recently, however, the species has been maintained as a species in the genus *Physarum* (Lado 2001; Neubert et al. 1995; Stephenson 2003).

In Ohio, the several treatments of slime molds for the state (Fullmer 1921; Keller and Braun 1999) do not include *P. gyrosum* as a part of the myxomycete biota.

Diagnostic Characters. The plasmodiocarps of this species are densely crowded and clumped in ash-grey masses, 2–3 mm high, 2–4 mm wide, with narrow sinuous ridges ca. 0.1–0.2 mm wide, which appear to form rings, nets, rosettes, or snakelike or wormlike patterns. The peridium is membranous and

single, and covered with whitish or slightly reddish calcareous granular deposits. The capillitium is dense and delicate, with frequent white, sharp transverse crosswall-like nodes, as well as smaller fusiform nodes. The spores are dark brown *en masse*, and faintly spinulose (Martin and Alexopoulos 1969; Nannenga-Bremekamp 1991; Neubert et al. 1995).

Specimen Citation. Ohio. Butler County: Oxford, Miami University campus, Upham Hall courtyard. Base of dead *Magnolia macrophylla* Michx., with *Coprinellus disseminatus* (Pers.: Fries) J. E. Lange, mosses, and bare soil. 39.508552°N, -84.733215°W, 276m. August 18, 2016. *Vincent 17611* (MU).

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BOOK REVIEW

Mary Siisip Geniusz. 2015. *Plants have so much to give us, all we have to do is ask: Anishinaabe botanical teachings.* (Edited by Wendy Makoons Geniusz, Illustrations by Annmarie Geniusz). University of Minnesota Press, 372 pp., paperback. ISBN 978-0-8166-9676-5. \$22.95.

This book presents a refreshing examination of plants and the people that have learned from the plants for countless generations in the Great Lakes region, the Anishinaabeg. The culture, self-identified as Anishinaabe (plural Anishinaabeg), consists of the Ojibwe, Ottawa, Potawatomi, and often the Cree and Menominee tribes. The author, editor, and illustrator each are Anishinaabe women, and the author in particular was both a teaching assistant and an apprentice to the late Ojibwe Anishinaabe medicine woman Keewaydinoquay Peschel, from whom most of the botanical and cultural teachings originated. The goal of this book is to present a decolonized, authentically Anishinaabe, perspective of how people can learn about traditional plant knowledge both from apprenticing with experts and from the plants directly. In doing so, this book is an essential contribution to the ethnobotany of the Great Lakes.

The introduction, which explains how the author wrote this book to fulfil an obligation to her elder and teacher, drew me into this book and reminded me of my own personal path with plants and the Anishinaabeg people. This book is a testament to the most authentic kind of ethnobotany, apprenticing with the elders, the great ones, the teachers, who are the bridges between past and future. The table of contents was thoughtful, using Anishinaabe names first, English common names for those reading them, and scientific names for making connections, providing authentic taxonomy of both folk and scientific methodologies. The layout of chapters unfolded into a story of how people learned in the old days and can still learn today.

Chapter 1, entitled “Traditional Anishinaabe Teaching About Plants” begins with a story of how things came to be using an *Aadizookan*, or traditional story, about the rose, rabbit, respect, balance, and acknowledgement of one’s part in an unintended catastrophe and ends up with the traditional orator’s closing. This story is used to explain the role played by each component of the earth, referring to them as brothers and proposing, as many traditions of indigenous wisdom or traditional knowledge do, that humans are the youngest brother, most vulnerable and dependent on the rest of our relations. This interconnectedness is authentically Anishinaabeg and indigenous to North America or Turtle Island. The author draws connections between the Anishinaabeg worldview and that of advanced scientific disciplines, invoking, for example, quantum mechanics and the findings of modern physics that subatomic particles respond to the actions of researchers studying them, concluding that the actions and thoughts of a person can change reality, both for the actor and for all of reality.

This book explores some of the more complex issues in medical botany and

ethnobotany, including how medicine men and women of the past acquired their knowledge and honed their craft. The examples given and the hypotheses that are discredited by the author, for example, the doctrine of signatures, are in accord with what is taught by leading ethnobotanists today. The author wisely compares the apprenticeship model of traditional medicine people with that of medical doctors in their residency. They even acknowledge the Midewiwin role in apprenticeship as corresponding to the accreditation of the American Medical Association. The Midewiwin is an ancient society of medicine men, women, and knowledge passed on through Mide' lodges which remain intact across Minnesota, Wisconsin, Michigan and Ontario. In a section in Chapter 1 entitled "Talking to Plants," the author explains why it is important to honor rocks and plants by talking to them and acknowledging their value and role in helping us, putting this into the context of the spiritual and physical roles that each species plays on earth.

The authors express an indigenous philosophy that is rarely acknowledged, but is nevertheless needed in the environmental and natural resources communities, including those comprised of botanists and ecologists. This approach deals with what is here, not with judging whether something is indigenous or not. It is concerned instead with whether a plant is useful or not and how we can use them in new ways. The stories in this book bring both ethnobotany and Keewaydinoquay alive.

Chapter 2 is an elegant retelling of the creation stories of grandma cedar, *Thuja occidentalis*, and bearberry, *Arctostaphylos uva-ursi*, involving the ancient Anishinaabeg as well as the otter, the black bear, the beaver, and the busy body, or grouse. It shows readers how Anishinaabeg families teach how living species came to be, why they look the way they do, and why they have the special uses and cultural roles that they do. It is worth the read in my opinion! The deep reverence and respect for cedars is captured in Geniusz's words "my grandmother cedar." This book, which is about the relationship between people and plants, will instruct readers how they can tap into the sacred and practical aspects of plants such as *Thuja* or grandma cedar. The practical uses essential to survival and good life in the Great Lakes region are discussed in a style that brings these items to life visually. Line drawings accompany vivid descriptions and oral stories that enliven the text by setting the reader in an intimate talking circle or campfire session with the author and her teacher, Keewaydinoquay. Some of the stories are fantastical, focusing on the cultural hero and demigod Nanaboozoo, using his misdeeds and overreaching for fame as a way of teaching lessons to the people. This book delves into traditional medicine at a basic level. It stresses caution and respect for plants and describes how they were used for ailments of the past as well as for modern illnesses like cancer. The practical uses of balsam fir, *Abies balsamea*, reminds me of my own ethnobotany classes, in which, like Keewaydinoquay, I encourage students to talk to the trees, pop balsam blisters growing on the bark for both the medicine and the fun of the exploding resin, among other uses.

The third chapter, focusing on conifers, begins with a story of why some trees lose their leaves (what we call deciduous trees) and why others keep them through the winter (evergreen trees). This story explains the current forest struc-

ture as a product of the way different trees treated a small bird with a broken wing during “the way back time” of oral tradition. For through the Anishinaabeg lens all organisms have voice, personality, and the will to do as they choose, and the consequences of the actions of ancient plants and animals shape the world we now live in. A nice short ethnobotany-styled treatment of each of the pines found in the Great Lakes region is followed by a description of the medicinal virtues of that pine, based on personal experiences, then by similar short sections on each of the spruces, tamarack, hemlock, and each of the junipers.

Chapter 4 highlights three culturally important food plants: cattails, *Typha latifolia* and *T. angustifolia*, swamp tea or Labrador tea, *Rhododendron groenlandicum*, and Jerusalem artichoke, *Helianthus tuberosus*. The quadruple food harvest potential of cattails is explained in a seasonal approach to which plant parts are available to eat and which are not worth one’s time (such as the starchy roots and rhizomes), and a discussion of how to prepare them, including a description of a cattail pollen and tern egg pancake. The author describes in detail many uses of cattails and their plant parts, citing historical ethnobotanists such as Huron Smith, who worked for the Milwaukee Public Museum in the 1920s and 1930s and whose manuscripts and ethnographic collections are still curated by the museum. The history of swamp tea, which used to be classified as a *Ledum*, now a species of *Rhododendron*, but always known as *mashkiigobag* to the Anishinaabeg, and its relationship to Asian black tea is very informative. As a result of the unavailability of tea from the warring regions of the South Pacific during World War II, swamp tea became the only acceptable substitute for many northerners, including both colonial settlers and the Anishinaabeg. The chapter concludes with the plant known today as sun chokes, sun tubers, or Jerusalem artichoke (*Helianthus tuberosus*), a lesser-known relative of the sunflower (*Helianthus annuus*). The illustration and description of this plant clearly enables the reader to identify this species and instills a desire to go plant some *Helianthus tuberosus* and to harvest the inulin-rich tubers after first frost.

Chapter 5, entitled “Four Traditional Plants in the Anishinaabeg Culture,” and Chapter 6, entitled “Medicinal Plants” highlight plants the author thought readers should be aware of, using stories to connect readers to the knowledge keepers of the past, especially the late ethnobotanist and Anishinaabe tradition bearer, Keewaydinoquay, referred to as Kee by her close friends, which includes the author of this book. The following passage, from page 280, is illuminating:

She [Kee] said that before the Europeans came and diagnosed people as having diabetes mellitus, the Anishinaabeg knew about the problem. They called it “the trouble with sugar in their water” or “the slow death when ants come to their urine,” meaning that the sugar in one’s urine attracted ants. Bearberry made it possible for many people to live long enough to bear and raise children. Nodjimahkwe urged Kee to begin daily usage of bearberry tea as a young woman to ward off the development of diabetes. When I knew Kee as an old woman she was still drinking it daily in a tea mixed with white or yellow sweet clover. She would make a gallon of the tea at a time and refrigerate it. She drank it all day long. She said that she could occasionally miss a day or two of using bearberry, but that her body would remind her to keep using it if she skipped the tea for a week or more.

The book concludes with several recipes that will be quite useful to those readers who like to experiment with natural products such as salves, soaps, tinctures, liniments, some foods (including the cattail pollen pancakes, jams, and Jerusalem artichoke chiffon pie). These are followed by a very useful “Ojibwe Word Glossary” and an “Ojibwe Plant Name Glossary,” both compiled by Wendy Makoons Geniusz, that will help readers interpret and better understand the Anishinaabeg words used throughout the book. Students and learners of ethnobotany would be missing an essential gem in this book if they overlook these glossaries. Speaking as an ethnobotanist myself, I am considering all kinds of ways to get young and old students of plants, Native Americans, history, the Great Lakes, traditional knowledge, and ethnobotany to light some cedar or sweetgrass smudge and pick up and delve into this transformative book.

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BOOK REVIEW

Anurag, Agrawal. 2017. *Monarchs and Milkweed: A Migrating Butterfly, a Poisonous Plant, and Their Remarkable Story of Coevolution*. Princeton University Press. Princeton, New Jersey. x + 284 pp., hardcover. ISBN 978-0-691-16635-3. \$29.95.

During my final year of graduate study at Northern Michigan University, several of my naturalist friends and I decided to take a long weekend, despite our need to continue writing our master's theses. We loaded up all of our plant presses, field guides, nets, collecting jars, binoculars, and spotting scopes and headed down to Peninsula Point in Delta County, Michigan. It was a beautiful fall day and we arrived early in the morning in order to get a glimpse of any birds making their way from Canada to their overwintering spots in the neotropics. However, the real stars of the show turned out to be the thousands of monarch butterflies that had gathered for their own continental migration. This natural spectacle sparked in me my love of Lepidoptera and eventually set me on a course of studying plant-herbivore interactions when I started a PhD about a year later.

Dr. Anurag Agrawal's new book has in no doubt been influenced by the hundreds of naturalists like myself who are entranced by the wonders of monarch biology. Dr. Agrawal, with years of studies under his belt, is one of the top plant-herbivore biologists in the world. Carefully tracing the life history of the monarch along its spring migration from Mexico to southern Canada and back again in the autumn, Dr. Agrawal weaves in classic studies, including past monarch research by the Urquharts and Lincoln Brower as well as insights from his own years of studying monarch caterpillars and milkweeds.

Dr. Agrawal's personal insight is what makes this book unique. Sandwiched between accounts of spring and fall monarch migration (which make up the first and last chapters of the book), are chapters in which Dr. Agrawal draws deeply from his expertise on plant-insect interactions. The discussion of the biology of milkweeds, and particularly their defense traits, is not only interesting in itself, but also provides a great general discussion on how chemistry and biology conspire to create the wonderful co-evolutionary study of monarchs and milkweeds. Dr. Agrawal makes it clear that this story isn't just about monarchs, but also about the diverse genus that contains milkweed. Here he discusses several species of the milkweed genus (*Asclepias*) and the various ways milkweeds have evolved to defend themselves from herbivore attack through chemical defenses and physical defenses. Dr. Agrawal shows that these defense traits vary among the roughly 140 species of milkweeds; for example, some relying heavily on chemicals to defend themselves, whereas others don't bother to produce as many chemicals and instead stick to trichomes for defense. The discussion of milkweed diversity, however, is primarily framed as being a problem for monarchs to solve. The rich research history on the common milkweed (*Asclepias syriaca*) is

used in great effect to demonstrate that these plants are not passive organisms in the evolution of monarchs and milkweeds. These middle chapters are accessible to non-biologists, but are also broad and sufficiently well-written that even serious chemical ecologists will find them interesting. While explaining the basics of milkweed traits that deter attacks by monarch caterpillars, Dr. Agrawal manages to incorporate numerous theories and examples of the biology behind plant defenses against herbivores. This gives a wonderful context behind the specifics of the back and forth co-evolution of monarchs and milkweeds. The description of these theories also makes this book an excellent introduction to many important concepts that have driven research in the field of plant-insect interactions.

Underlying the tale of monarchs strung throughout this book is a very basic introduction to co-evolution, ecology, and population biology. It is this story about population biology that most readers may be interested in, as it addresses the current research on monarch decline. Here Dr. Agrawal wades into the controversy over the hypothesis that monarch decline is connected to a supposed decline of milkweed populations in the United States. In a very detailed retelling of personal research that Dr. Agrawal and several collaborators have undertaken, he carefully examines what we know about monarch populations and draws upon years of citizen science data. His conclusion that the decline in monarch populations has not been caused by a decline in milkweeds is carefully cushioned by an engaging section about spurious correlations and which concludes that halting monarch decline will not be solved simply by planting more milkweeds.

This book will be a real pleasure to read for both professional scientists and those that have a love of nature. For non-technical readers, the layout is easy to read and there are no in-text citations. For those that do want to explore the primary literature, the author has provided plenty of citations that can be found in detailed notes organized by chapter at the end of the book. The colorful photos, illustrations, and graphs peppered throughout the book serve to enhance the reader's understanding of the more complex and technical aspects of this story that are described in the rich discussions. After finishing this book, it was all I could do to keep from from planning my next fall trip to Peninsula Point to witness the magic of a warm fall day and the thousands of monarchs engaging in a long story of evolutionary ecology.

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INSTRUCTIONS TO AUTHORS

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7. Literature Cited: List citations alphabetically by author’s last name. The first author’s name is to be listed with surname first, followed by initials (e.g. Smith, E. B.), and subsequent authors are to be listed with initials first. Separate author’s initials with a single space. The year of publication should appear in parentheses immediately before the title of the citation. The entire journal name or book title should be spelled out. Please put a space after the colon when citing volume number and page numbers.
8. Italicize all scientific names. Voucher specimens must be cited in floristic works and in any other study whose results depend on the identity of the plant(s). Papers citing plant records without documenting vouchers are generally not acceptable.
9. Manuscripts must be submitted electronically to the email address of the editor. All manuscripts will be reviewed by at least two referees.

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On the cover: Emma J. Cole as she appeared in the 1895 Yearbook, Central High School, Grand Rapids, Michigan. Grand Rapids History & Special Collections, Archives, Grand Rapids Public Library, Grand Rapids, Michigan.